The Milbank Memorial Fund

QUARTERLY

CONTENTS

		Page
Health Security	*Thomas Parran, Jr., M.D.*	113
Chronic Disease as a Public Health Problem	*Hugh S. Cumming, M.D., D.Sc., LL.D.*	125
Advancing the Health and Welfare of the Nation's Children Through Federal and State Cooperation	*Katharine F. Lenroot*	132
Measuring Health Needs in an Urban District	*Dorothy G. Wiehl*	144
How Much Work Can a Rural Public Health Nurse Do?	*Marian G. Randall, R.N.*	163
Recent Trends in Birth Rates Among Foreign and Native-White Married Women in Up-State New York	*Clyde V. Kiser*	173
Epidemiology of Whooping Cough in a Rural Area	*Ralph E. Wheeler, M.D., D.P.H.*	180
Annotations	*Bailey B. Burritt, Edgar Sydenstricker, and Jean Downes*	201

Vol. XIV APRIL, 1936 No. 2

Edited by the Technical Staff

Published quarterly by the MILBANK MEMORIAL FUND, 40 Wall Street, New York, New York. Printed in the U.S.A. Subscription: $1.00 a year

EDGAR SYDENSTRICKER

July 15, 1881 — March 19, 1936

With deep regret, the Milbank Memorial Fund announces the sudden death of Edgar Sydenstricker, its Scientific Director, on March 19, 1936. The following Minute was adopted by the Fund's Board of Directors at its meeting on March 20th:

> The Directors of the Milbank Memorial Fund are profoundly shocked and grieved by the death of Edgar Sydenstricker, who for ten years had been closely associated with all the activities of the Fund and in the last year of his life was its administrative head.
>
> In July, 1926, Mr. Sydenstricker accepted an invitation to give part of his time to the Fund as Statistical Consultant while still retaining his position as Chief Statistician of the United States Public Health Service. His contributions to the plans and activities of the Fund were so valuable that in 1928 he was persuaded to accept a permanent full-time position as Director of Research, which title he retained until 1935, when he became Scientific Director in active charge of the Fund's administration.
>
> Before coming to New York, Mr. Sydenstricker had won wide recognition and distinction in his special field of vital statistics and had already shown a keen interest in and a remarkable grasp of the social problems to aid in the solution of which the Milbank Memorial Fund is dedicated. The later years greatly broadened his interests and activities and his singularly penetrating and candid mind, coupled with a practical appreciation of realities, made his judgment valued and sought both nationally and internationally.
>
> No appreciation of Mr. Sydenstricker would be complete without a word of tribute to his quiet, lovable, and sympathetic personality which endeared him personally to every member of the Staff and of this Board.
>
> The Directors of the Milbank Memorial Fund wish to record their lasting indebtedness to Edgar Sydenstricker for his great service to the Fund and to the cause for which it was established and is maintained.

HEALTH SECURITY[1]

by THOMAS PARRAN, JR., M.D.[2]

IT is in the research laboratory that great events in medicine and public health usually are born. Just two weeks ago, however, there occurred in Washington one of the most significant events in the history of public health in this nation when President Roosevelt signed a bill appropriating money to launch the social security program.

Most people think of social security in terms of unemployment insurance and old age pensions, yet the law includes provisions through which, for the first time, we get a start on a national program to protect and promote the health of the people.

This is entirely appropriate, for the destitution arising from sickness or death of the wage-earner is a prime factor among those circumstances which contribute to the insecurity of people. Yet much of this is preventable, as you have observed in your tuberculosis work where children become dependent and delinquent as the direct result of the death of a parent. Any national effort, therefore, to promote social security must include a serious attempt to prevent unnecessary disease and death.

The Social Security Act authorizes ten million dollars to the United States Public Health Service, of which two million is for research to develop improved methods of disease control. Eight million will be allotted to the states for public health work, allotments being made on the basis of population, special health problems, and the financial needs of the states.

The Act also authorizes nearly seven million dollars to the United States Children's Bureau for the health of mothers and children and for the care of crippled children. Grants from these

[1] An address at the annual meeting of the New York Tuberculosis and Health Association, New York City, February 25, 1936. This paper will also be published in the April issue of the *American Journal of Public Health*, p. 329.

[2] Newly appointed Surgeon General of the States Public Health Service.

funds are made on the basis of the number of live births in each state, the number of crippled children, the health needs and the financial status of the state, preference being given to the needs of rural areas. In general, it is contemplated that state and local appropriations will match the federal funds and that proper standards of service will be required for a cooperative attack upon those conditions which undermine the health of the people and contribute to insecurity.

Though it falls short of the millenium the good health officer longs for, this program reasonably may be expected to advance the health of this country to new and higher levels. Moreover, as in the past, a good and useful act frequently is useful far beyond its occasion. For example, when Sir Humphrey Davy in 1810 first discovered a greenish-yellow gas which he called chlorine, little did he dream that through its use today in sterilizing 85 per cent of the public water supplies in this country, typhoid fever would become a rare disease. Further, this same chlorine was used to cure wounds in the World War, and it bleached the paper on which my remarks are typed.

Neither was the new order in public health, which has resulted from their charitable endeavors, foreseen by the founders of the State Charities Aid Association and the Charity Organization Society, through which the tuberculosis and public health movement of our State and City have come into being. These fine citizens saw misery about them. They sought to relieve it. As they inquired further into its causes, they were appalled to discover how vast and how vicious was the part played by tuberculosis. The term social security had not been coined; but in order to reduce the number of children made orphans and the number of families needing alms because of the illness or death of the wage-earner, the group set out to fight tuberculosis. Then, as now, there was no specific either for prevention or cure of the disease, so education was used as a weapon against it. Through

skillful political organization, the Legislature was induced to provide for the institutional care of patients. Indeed the "charity lobby," as it is known at Albany, led by Homer Folks, that devoted champion of the downtrodden and the sick, through more than thirty years, session by session, has built up a powerful body of supporters not only for tuberculosis work but for all good public health measures.

This citizen fight against tuberculosis, which you started, had a significance far beyond the 65 per cent reduction in deaths from tuberculosis, great as that accomplishment has been. Its greatest significance lay in the demonstration of a new weapon for use against *all* preventable disease—the fact that scientific knowledge of disease *could* be interpreted to the people; that public health action could be organized as a result of this education; and that an enlightened citizenship was of more value than quarantine laws in disease control. Before that time public health effort had been largely restrictive, legalistic, concerned primarily with the cleaning up of filth and the use of police powers by health officers. You made possible a new bi-partisan partnership of the people and their governmental agencies, state and local, which has been more valuable in reducing the incidence of tuberculosis than all the police powers of health officers ever on the statute books.

It seems clear, then, that from the efforts of just such groups as yours there has arisen in the American mind the desire not only to relieve misery due to sickness, death, and destitution, but also wherever and however possible, to ward it off entirely. This is not a transitory emotion born in the panic of economic disaster. Its roots go deep. As Sir Arthur Newsholme has said, "We all agree that no civilized community is justified in permitting any of its members to suffer, much less to die, for lack of food, clothing, shelter, or medical aid when sick. This obligation is everywhere acknowledged, both in America and Great Britain, however imperfectly it is met." What Sir Arthur elsewhere calls

the "growth in the sentiment against suffering," expressed in your movement beginning a generation ago, was the first step in the modern method of meeting this obligation of a "civilized community." In the years since the beginning of your movement, we have come into an economic life permanently altered from a self-sufficient rural and agrarian system into an inter-dependent urban, industrial system. In addition, education has become more general and medical science has advanced tremendously. The whole composite is a people not only in need of good public health service but a people who are increasingly aware that through good health there is available a large degree of that security which is their deep desire.

Since a population increasingly aware of its need tends to require an increasing amount of health service at public expense, there are those who look upon this manifestation of representative government as an unreasonable burden upon the taxpayer and an unwarranted interference with the right of the individual to be sick if he wishes. Chief Justice Hughes, who, as Governor of New York, sponsored actively the first tuberculosis control movement, has said:

> The settlement and consequent contraction of our landed domain, the pressure of a constantly increasing density of population, the interrelation of the activities of our people, and the complexity of our economic interests have inevitably led to *an increased use of the organization of society in order to protect the very bases of individual opportunity.*

Note that; "in order to protect the very bases of individual opportunity." According to the Chief Justice, then, and many of us feel that your work here in New York has been a first class demonstration of the theory, one must use social legislation in order to protect and advance individualism.

It matters little what party may be in power or what may be the current political slogan, the public when awakened to the

saving of life and relief from suffering which is possible, will continue to provide for itself an increasing amount of tuberculosis and other health service as one means of security. Fortunately the cost is well within our ability to pay, as has been the cost of our campaigns against tuberculosis itself; against diphtheria, which your organization has sponsored since 1926; against typhoid; against yellow fever; against smallpox. In fact, it is far more economical of the public funds to prosecute such campaigns than to neglect them.

Do not hope for too much from the health measures which can be carried out under the present Social Security Act. They are only the first feeble steps of a people who at last are beginning to realize what they need. In public health work we stand today just about where we were in public education in the middle of the last century. I hope that in our attempt to provide good health for everyone we may avoid some of the blunders which characterized our effort to make an education available for all, through measures more generous than they were discriminating. If we do avoid such blunders, it will be largely the responsibility of people like yourselves who have been a generation ahead in your thinking about public health. You fathered the security movement originally, for you fostered the hope that for poor as well as rich, health and a healthful heritage were available, if good citizens would organize to provide them. New York has done well, though even here we barely have scratched the surface of what is possible in health protection. In many other states it seems apparent that not even the surface will be scratched without the stimulation, leadership, and help of a long-range, soundly planned national health program which it is possible to initiate under the social security law. I trust that you, as individuals and as an organization will guide, encourage, warn, and counsel the makers of that program; for it is built on the foundation stones you laid.

From my own point of view, it seems probable that effective health security can be achieved only through the extension into the states where it does not now exist of the New York method; which is a bi-partisan partnership of the people and the health agencies of government, state and local. In particular, I hope that you will make yourselves felt through such partnership in the prevention of three evils which may threaten the working out of social security. These evils, as I see them, are: First, that because of our lack of vision and of experience and of health organization in many states, some funds may be spent for purposes of secondary importance; second, that in a few places, short-sighted authorities may look upon the relatively small federal grants of about ten cents per capita as a means of relieving local budgets rather than as an opportunity of doing needed work; and third, that sometimes it may be forgotten that disease and death are non-partisan and that we may fail to place the right health official in the place because he is of the wrong political faith.

In my simple philosophy, the greatest need for health action is where the greatest saving of life and suffering can be made. I shall mention a few of the more obvious opportunities where experience has proven that the investment of public funds and citizen interest will bring a large return.

First I would place the necessity for finishing the job in tuberculosis. The tremendous decline in the disease in this State from a death rate of 173 per hundred thousand in 1905 to less than 50 in 1935 should not obscure the fact that it is still the leading cause of death in the age group between 20 and 40. Up to now we have talked and hoped for partial control. One of the most conservative of our public health authorities, Dr. Wade H. Frost of Johns Hopkins University, in a recent article advances convincing arguments that we can now begin to think about the eradication of tuberculosis. Only two factors, he says, bar this

possibility. One is that in years to come the tuberculosis germ may become more virulent; the other is that we as a people may become less resistant to it. Neither contingency seems probable to him.

It is interesting to observe that a conservative scientific statement of today surpasses the most enthusiastic hopes of the last generation. Moreover, in working toward the goal of eradication, we know just where to focus our attack:

> Upon first, the young woman in industry or the young mother;
> next, the worker in the dusty trades which form the background for many an unpublicized "Gauley Bridge" disaster;
> also, the Negro, and members of certain other racial groups;
> and last, the man or woman who is ignorant, poorly fed, and badly housed.

It is a great day for public health when we can anticipate the conquering of tuberculosis, against which we have made progress. But an even greater opportunity exists for the eradication of syphilis against which we have made no progress, though its end results crowd our jails, our poorhouses, and our insane asylums. Yet there are specific methods of controlling it which are better authenticated by science than the means of controlling tuberculosis. Sweden and Denmark are two countries which have shown us how to do the job and we are well-launched in a serious effort against syphilis in New York State and City.

Deaths from cancer are increasing and stand second among all causes. Yet at least 20 per cent of them could be prevented if cases could be recognized early and if we had everywhere the facilities for proper diagnosis and treatment.

Deaths among children under five years of age have declined from 30 per cent to 8 per cent of the total since this organization was started, but the mortality rates of mothers in childbirth, and among babies in the first month of life, are still disgracefully high; although authorities agree that well-placed effort, using

proven methods, could within a few years reduce them to one-half the present level.

In addition, more children and adults alike suffer from faulty nutrition than from any other form of physical impairment except dental defects, which is one result of an improper diet. Yet we do little but talk about correcting these conditions. It is high time we act; for our present knowledge of nutrition, as was forcefully stated at the last meeting of the American Medical Association by its president, Dr. J. W. McLester, shows definitely that the future of the race will depend upon the food we eat to a greater degree than in the past we have profited by control of the communicable diseases.

Little is done in many of the states to restore crippled children to lives of usefulness, although New York and a few others have shown the way that much is possible. The social security plan to organize, assist, and raise standards of this work on a nation-wide basis is not only humanitarian but soundly economical.

In short, in each of the instances I have mentioned where the saving of life and the relief of suffering have been scientifically demonstrated to wait only upon organized effort, our national picture shows a great unevenness of performance which ranges from nothing at all to the good beginning—but not by any manner of means the full execution—of New York and some of her sister states. The first task, then, to be accomplished in a program for health security, would seem to be the leveling up of present services. The means of doing this are simple and include first, the provision of the necessary human machinery. We need, and do not have, in every city and county, or comparable area, a well-trained full-time health officer with a sufficient technical staff holding office on the basis of merit, not politics. The second need is a minimum budget to perform essential tasks with national leadership, plus citizen backing, for the energetic prosecution of those tasks which will best repay, in human as well as financial

returns, the expenditure of money and effort. But a leveling up to our present best standards will not alone achieve health security for us. The whole population, employed and unemployed alike, needs a better distribution of good medical and nursing care. For those who are destitute, all necessities of life including medical care must be provided. For the one-half of the population which even in the prosperous Twenties had an income too small to provide for itself all necessary medical services, public funds must supplement individual effort.

There are several ways of doing this. It might be done through health insurance which would increase the availability of medical service and distribute the cost. Another proposal is state medicine which would make medical care available on the same basis as public education. A third possibility, the one toward which I myself incline, would require liberalizing of the present medical practice and coordinating it with public health and medical services. This would assist the private physician by providing for him laboratory, hospital, nursing, and other facilities for the treatment of his cases and would relieve part of the load of catastrophic and chronic illness from the low-income group. Whichever of these plans is adopted, or whatever modification of any of them, the fact remains that it must be possible for the whole population to secure medical care if we are to attain any semblance of health security.

Pneumonia, with its 12,000 deaths last year in New York State, is an example of a disease which can be fought successfully by cooperation between public health official and private physician. In the campaign now under way to reduce deaths from this cause, under the joint direction of the Medical Society of the State of New York, the State Department of Health, and the State Association of Public Health Laboratories, facilities for the best treatment of pneumonia are put into the hands of every Up-State physician; free laboratory tests are made to determine the type of

pneumonia; and a new, better, concentrated serum, costing at retail from $20 to $100 per patient, is supplied without charge by the State Department of Health to any physician who asks it. In addition, the State Department of Health, through its own staff of regular and WPA nurses and in cooperation with the visiting nurse associations of Up-State cities, volunteers to supply needed nursing service to all patients not hospitalized. The State Medical Society volunteers to give its own members up-to-date post-graduate training in the management of pneumonia, under the direction of skilled pneumonia specialists. All agencies plan to work together for public education.

This is as yet a new venture. Its various factors are not yet in complete and perfect alignment. Nevertheless it is significant, both as an example of how public and professional agencies can work effectively together toward a public health end and, concretely, how the private practice of medicine can be supplemented by better public facilities—in this case, laboratory, nursing, and serological service. It is too early to forecast definitely what the results will be, but conservative estimates indicate that a few years of continuous and concerted effort will cut down the deaths from pneumonia by at least one-fourth.

Nevertheless, when all these things have been done; after we have leveled up our present public health services and prevented much existing disease, and after we have provided good medical, nursing, and dental care for less easily preventable disease, we still need to control the unhealthful factors in the environment. Sanitary housing in England, and in many continental countries is considered a direct public health responsibility. Here we seem strangely oblivious to anything except its job-making possibilities. Food of the kind and quality for good nutrition is more important than clinics for the undernourished, yet we have made the most casual attempts to improve the diet of the millions fed at public expense and no more than a gesture at improving the food

habits of the rest of the population. To provide these and other factors in a healthful environment requires a job at a fair wage. We should, by now, have learned that it is better judgment to provide useful work for the unemployed, than to continue, through insistence on the cheapest possible dole, to add continuously to the ranks of the physically and mentally unemployable. I emphasize the word "useful." Frequently we have failed to provide useful work because that requires planning, and there seems to be here and there the idea among partisans that it is somehow un-American to do planning for the public benefit. However, the continuing good health record of the people in this State which, during this past year surpassed all previous records, has resulted directly from our relief and unemployment methods—faulty as they are—no less than from the direct application of medical science to disease problems.

Though I have warned you not to hope for too much from the health program possible under the Social Security Act, I think that most of us are heartened by the fact that at long last this beginning is being made. Just as a generation ago the founders of your organization broke through the apathy of State and City toward tuberculosis, which caused so much needless suffering and destitution, so today we feel that we have cracked the crust of national indifference to public health as a function of government.

In behalf of your cause you have waged war in the State and City against the unscrupulous, the ignorant, and the self-seeking. I know, therefore, that you will understand the necessity of caution in the working out of the national health program—the effort that will be required to avoid potential evils arising from lack of experience, lack of vision, and the tendency to partisanship. It is my hope that through this and through your national organization your influence may be felt for sound policy.

Whether you agree with me or not in the detail of health action which should be initiated, will you exert to the fullest your pre-

rogatives as citizen-partners and consider ways and means of attaining, here and elsewhere, the three objectives with which I feel confident you will agree in intent.

First, how may we level up our existing health services? And remember this means the wards and boroughs of New York City, cities and counties of New York State, as well as the backward and the progressive states. For in this way only shall we be able to lift the load of preventable disease.

Second, how may we redistribute medical, dental, and nursing care? Half the population is unable to obtain sufficient care for themselves. Half the professional population has neither a living income nor a full-time task. Whether you like my way or another, some way must be found.

And third, how may we control the health factors in the environment—housing, food, work and working conditions, a living wage? For surely it seems an unscientific use of our effort and an unbusiness-like failure to order our affairs, when we struggle to control and to cure disease that could be prevented at the source.

These several considerations belong to the whole challenging field of health security in which, as you yourselves have demonstrated, citizen interest is equal if not superior to that of the health official. But in conclusion, let me remind you of our joint, special interest in health security, which requires an addition to your time-honored slogan. Let it now read: Tuberculosis is preventable; tuberculosis is curable; tuberculosis can be wiped out in our State and Nation!

CHRONIC DISEASE AS A PUBLIC HEALTH PROBLEM[1]

by HUGH S. CUMMING, M.D., D.SC., LL.D.

THE period of economic depression through which we have passed in recent years has taught us many valuable lessons, not the least of which is a realization that coming years must see an expanding field of public health. Today, it is clear that public health activity must embrace other fields than the prevention and control of communicable diseases. Today, it is clear that the outstanding public health problem is the prevention and control of chronic disease.

Fifty years ago, the expectancy of life at birth in the United States was about forty years. Today, it is around sixty-one—a gain of some twenty years. This increase has been accomplished largely through public health measures. Better sanitation, improved water supplies and sewerage systems, the advance of bacteriology, education for personal hygiene, and a successful attack upon communicable diseases have all contributed to this advance. Tuberculosis, typhoid fever, and diphtheria as well as other diseases have been decreasing, some of them to the vanishing point. Modern infant and maternal welfare work has saved the lives of thousands of infants, and, as a result, the average age of the population has increased.

The astonishing lengthening of expectation of life at birth may well be regarded as the most impressive advance made by the human race in any direction for a thousand years. However, we cannot regard this as a promise that adults at any given age may expect to live many years longer than could those at the same age fifty years ago. Studies of life tables indicate, for example, that no

[1] An address delivered at a meeting held by the Welfare Council in New York, January 22, 1936. Dr. Cumming retired on January 31, 1936, as Surgeon General of the United States Public Health Service after sixteen years in that position and after forty-two years in the Service.

more than a small increase may be expected by adults living today in the productive age groups, from thirty to fifty years of age. For those individuals past fifty, no such optimistic statement may be made. A glance at life tables of the Commonwealth of Massachusetts from 1789 to 1930 shows that the expectancy of life of people at sixty has decreased a fraction of a year. This decrease is in line with a similar decrease in the expectation of life of the same age group in the original death registration states from 1900 to 1930, as well as in the 1920 death registration states from 1920 to 1930. The decrease in the expectation of life at age of sixty was nearly 5 per cent in Massachusetts, and in the original registration states, 2 per cent. Similar examination of records of the original death registration states indicates that among males in age group fifty to eighty years, the expectancy of life was actually higher in 1890 and 1900 than in any year from 1922 to 1927.

Another point to be considered is the increasing age of the population of the United States. Immigration has been restricted, thus decreasing the number of young adults of the productive and child-bearing ages. The birth rate has declined and is declining, even the actual number of births declined between 1920 and 1930. The result of these combined forces is a higher percentage of the older age group in the total population. In 1880, 11.8 per cent of the population was over fifty; in 1910, this age group accounted for 13.9 per cent of the population and in 1930, 17.2 per cent of the total population of the United States was over fifty years of age. It has been estimated that the proportion of persons in this age group will keep on increasing in the population of the future, until in 1980 over one-fourth of our people will be in the older age groups. Such facts as these have turned the attention of public health workers to the problem of determining and initiating measures to protect the health of this large group of people.

The past fifty years have witnessed a change in the type of diseases causing death in the older age groups, and a consideration

of this change will emphasize the importance of recognizing chronic disease as a vital public health problem. In 1900, only three-tenths of all deaths in persons over fifty years of age were due to heart diseases, kidney diseases, and cancer (including tumor). Today, over one-half of the deaths over fifty are registered for these causes. This change forces thoughtful public health workers to consider certain conditions that arise with the presence of chronic disease. Individuals with a chronic degenerative disease usually suffer over a much longer period of time than those with acute diseases. So little information is available as to the duration of chronic disease that we cannot estimate the economic burden imposed upon individuals and those responsible for giving them adequate care. We do know that when a chronic patient is admitted to a general hospital, his admission compels the hospital to exclude from three to ten acute cases. Many general hospitals have therefore excluded chronic cases for treatment; such hospitals estimate the average length of a patient's stay to be only fourteen days, while hospitals admitting both chronic and acute cases estimate the average length of treatment to be from twenty-three days to thirty days. It is not necessary to point out to this conference the disastrous economic effect upon individuals and families combating chronic illness.

The aging of the population, the increase in death rates among the older age groups, the increase in death rates from chronic disease, and the growing need for care of the chronically ill are straws in the wind—important straws that have stimulated the United States Public Health Service to undertake a study of the chronic disease situation. The survey is a project of the Office of Statistical Investigation. Known as the National Health Inventory, it is being conducted in nineteen states, and has been organized on the largest scale, commanding the widest scope of any similar survey yet undertaken in this country. It is designed to study the extent and nature of disability in the general population, with special

reference to chronic disease and physical impairment. Answers to many of the questions which thoughtful public health workers are asking about chronic disease are being sought. What is the volume of chronic disease in the general population of the United States? How is it distributed throughout the country? What is the age and sex distribution of these diseases? Is occupation a factor in chronic disease? Nationality? Unemployment? Housing, with reference to crowding? What are the urban-rural aspects of the problem? What disability is caused by chronic diseases? What economic problems are associated with it? How is chronic disease cared for? To what extent are the facilities now available to the sick being used in different types of communities? Are more facilities needed, and if so what kind of facilities?

The United States Public Health Service believes that these questions must be asked and answered before the health service of the future can intelligently approach a solution of the chronic disease problem. In order to obtain answers to these questions, the survey is attacking on various lines. First, a house-to-house canvass in ninety-five communities, located in nineteen states, representing the various geographic divisions of the country; second, an inventory of public health and medical facilities throughout the nation; third, a study of morbidity and mortality according to occupation, based upon the records of sick-benefit associations in industry; and fourth, communication with every physician attending a case of illness reported in the house-to-house canvass, for the purpose of obtaining his technical knowledge of the nature of the disabling illness. This material is now being collected.

At present the house-to-house canvass is at the peak of its activity. This study is going on in both urban and rural communities. Information is obtained on approximately 3,000,000 individuals. The enumerators, from relief rolls, have been carefully selected and especially trained for this type of work. In the larger cities, sample areas are surveyed, while in the majority of the communi-

ties every family is canvassed. In New York, which is one of the sampled cities, every thirty-fifth dwelling is being canvassed, which makes nearly a 3 per cent sample of all persons in the City. Age, sex, nativity, marital status, occupation, and employment of both the sick and the well are recorded. Enumerators request an estimate of the income of every family, in order to study the relation of disease to economic status. Number of rooms in the house, comparative rentals and appraisals, and certain sanitation factors are recorded.

Next, information is recorded as to the illnesses present in the family on the day of the visit; their duration; the amount of disability; the kind and source of medical care, if any; hospitalization; nursing care; and amount of time lost from work. Further, any illnesses disabling for seven days or longer during the past year are recorded in the same way. And, finally, a similar record is made of the presence of specific chronic diseases and physical impairments regardless of whether such ailments are disabling on the day of the enumerator's visit, or have not been seriously disabling during the past year.

The inventory of public health and medical facilities, supplementing the information now available, is equally thorough, comprising records of public health agencies, both official and unofficial; medical facilities, including the distribution of physicians, hospitals, and institutions; and the number and distribution of public health nurses, nurses in private practice, and nurses employed by visiting nurse associations, public and private. All existing material is utilized, such as data already published by the American Medical Association, the American Hospital Association, and other agencies, including the American Public Health Association. New data is collected only where and when it is needed in order to fill up gaps in the knowledge and inventory of health and medical facilities. This phase of the work will not involve the employment of relief personnel. Most important of all,

the inventory of public health and medical facilities will be coordinated with the information obtained in the house-to-house illness survey. The value of this phase of the survey to the study of chronic disease is clearly seen when we can correlate the disability and duration of chronic disease not only with medical facilities available, but also with the extent to which such facilities are used by the chronically ill.

Statistical research in the prevention, control, and cure of the communicable diseases has already proved its worth. Epidemiological studies have played an important part in the control of typhoid fever, malaria, and tuberculosis, and in the reduction of infant mortality. If our surveyed population is a fair sample of the general population, and we believe it is, the data, when analyzed, will furnish more light on many of the baffling questions of epidemiology regarding these diseases.

Epidemiological studies reveal significant factors in the occurrence of specific diseases—for example, age, sex, economic status, nationality, and density of population. It is the purpose of the present survey to determine the significance of intimately associated conditions in the chronic disease problem. The data will furnish more light on many of the baffling questions of epidemiology regarding these diseases, and will represent the contribution of statistical research toward discovering how social and economic factors are related to chronic illness.

To learn the rate of complete disability in chronic disease is one of the important purposes of the survey. It is also necessary to estimate the percentage of the chronically ill who are cared for at home, the percentage receiving hospital care, or who were hospitalized during the past year. The check-up on medical service obtained, the inventory of local hospitals, relief agencies, public health clinics, and other organizations will tell us what percentage of the chronically ill in the lower-income levels receive medical care.

A comparison of sickness rates in the country with those in specific occupations in the city will indicate what significance different living conditions and different working conditions have in the extent and nature of chronic diseases.

The presence of a chronic illness in a household puts a staggering burden on the ability of the family to remain self-supporting, while securing adequate medical care for the patient. Even in the face of the present lack of knowledge as to the extent of economic disability due to chronic disease, we know that most of the victims of these diseases are incapacitated and impoverished. A recent survey made by the Public Health Service in ten cities showed that families hardest hit by the depression received only about one-half the amount of medical care obtained by the comfortable group; this difference would have been much greater except for the large volume of free care received by the poor group. This free service included services paid for by state or local government, service rendered without cost by physicians, and aid from private philanthropy. However, chronic disease with its resultant disability, suffering, and economic loss now constitutes so vast a problem that we cannot look to private philanthropy for its solution. Nor can we expect physicians and institutions to bear the burden unaided. Nothing less than an active and nationwide recognition of chronic disease as a public health problem will provide the impetus for a concerted attack, by federal, state, and local public welfare agencies, both public and private.

ADVANCING THE HEALTH AND WELFARE OF THE NATION'S CHILDREN THROUGH FEDERAL AND STATE COOPERATION

by KATHARINE F. LENROOT[1]

ON Monday, February 24, 1936, the Children's Bureau of the United States Department of Labor announced approval of ten state plans for maternal and child-health services to be carried on under the Social Security Act. The plans cover the five-month period ending June 30, 1936, and the states are the following: Connecticut, Kansas, Maine, Massachusetts, Minnesota, New Mexico, New York, South Dakota, Washington, and West Virginia. Plans prepared by the state departments of health have been received from thirty-three other states and are being reviewed with a view to early approval. Under the Act, Alaska, Hawaii, and the District of Columbia are entitled to participate on the same basis as the states. A total of $1,580,000 for maternal and child health was made available for the five-month period under the Supplemental Appropriation Act approved February 11, 1936, and it is estimated that the states will be able to meet the requirements of the Act so fully as to take advantage of nearly all the funds provided. On an annual basis, the amount authorized to be appropriated for this part of the program is $3,800,000.

Apportionment of federal funds for maternal and child health is made by the Secretary of Labor on the following basis: An initial uniform grant to all the states; an additional apportionment on the basis of the ratio of live births in the state to the total live births in the United States; and an allotment based on the need of the state for financial assistance in carrying out its state plan, after the number of live births is taken into consideration. Funds allotted according to the first two methods (uniform grant and

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live births) must be matched in full by state or state and local funds.

The purpose of this section of the Act, which is contained in Title V, Part 1, is that of "enabling each state to extend and improve, as far as is practicable under the conditions of such state, services for promoting the health of mothers and children, especially in rural areas and in areas suffering from severe economic distress."

In order to receive approval, the state plans must meet the following conditions set forth in the Act: financial participation by the state; administration or supervision of administration by a state agency; such methods of administration (other than those relating to selection, tenure of office, and compensation of personnel) as are necessary for efficient operation of the plan; provision for such reports as the Secretary of Labor may require; extension and improvement of local maternal and child-health services; cooperation with medical, nursing, and welfare groups and organizations; and provision for development of demonstration services in needy areas and among groups in special need.

The Children's Bureau is responsible for administering two other parts of the Social Security Act, both contained in Title V, namely, Services for Crippled Children, and Child Welfare Services. The provisions of Title IV, with regard to grants to states for aid to dependent children in their own homes who have been deprived of parental support or care by reason of the death, continued absence from the home, or physical or mental incapacity of a parent, are administered by the Social Security Board.

For the five-month period ending June 30, 1936, $1,187,000 is made available, $2,850,000 being authorized on an annual basis for services to crippled children, on the basis of a uniform allotment by the Secretary of Labor to each state and an additional allotment according to the need of each state as determined by the Secretary of Labor after taking into consideration the number

of crippled children in the state in need of the services assisted and the cost of furnishing such services to them. These grants must be matched in full by state or state and local public funds. By March second plans for three states had been approved, and plans for nineteen other states were being reviewed by the Children's Bureau. Preliminary material has been received from fourteen other states. Administrative responsibility in the state may be vested in any state agency having responsibility for the administration of medical and health services for crippled children.

The purpose of the cooperative program for services to crippled children is stated to be to enable each state "to extend and improve (especially in rural areas and in areas suffering from severe economic distress), as far as practicable under the conditions in such state, services for locating crippled children, and for providing medical, surgical, corrective, and other services and care, and facilities for diagnosis, hospitalization, and after-care for children who are crippled or who are suffering from conditions which lead to crippling." Requirements which must be met in state plans are similar to those required for aid for maternal and child health services. Specific provision must be made for cooperation with any agency in the state charged with administering state laws providing for vocational rehabilitation of physically handicapped children (an activity for which increased federal aid, to be administered by the Office of Education, is authorized by Title V, Part 4, of the Social Security Act).

Alabama is the first state to have approved a plan for child welfare services, under Part 3 of the Social Security Act. This is the state which, prior to the depression, had placed in nearly every county, outside those containing the three largest cities, a social worker paid partly from school funds and partly from other public funds, to do attendance work for the schools, probation work for the courts, and general children's aid service for children in need of such assistance. For the past year it has been attempting to re-

build child welfare services which had been largely absorbed by relief administration, an aim which will be greatly advanced by the federal cooperation now made available. Preliminary estimates for child welfare services have been received from thirty-eight states. Official plans have been received from seventeen states, in addition to Alabama, and are now being reviewed.

This portion of the Social Security Act, though providing a definite basis for allotments of funds (in part a uniform grant and in part on the basis of rural population) is more flexible than the other parts of the Act relating to children with reference to the development of plans and the proportion of state and local funds required. Its purpose is "to enable the United States, through the Children's Bureau, to cooperate with state public welfare agencies in establishing, extending, and strengthening, especially in predominantly rural areas, public welfare services for the protection and care of homeless, dependent, and neglected children, and children in danger of becoming delinquent." The amount authorized ($1,500,000 on an annual basis, $625,000 for five months) is allotted by the Secretary of Labor for use by cooperating state public welfare agencies on the basis of plans developed jointly by the state agency and the Children's Bureau. The amounts so allotted are to be expended for payment of part of the cost of district, county, or other local child welfare services in areas predominantly rural, and for developing state services for the encouragement and assistance of adequate methods of community child welfare organization in areas predominantly rural and other areas of special need.

For the administration of these portions of the Act and for such studies and investigations as are necessary to promote their efficient administration, the Children's Bureau has available $110,000 for the remainder of the current fiscal year, and $320,000 has been recommended by the Bureau of the Budget for the fiscal year 1937. General responsibility for the development of the maternal

and child health and crippled children's services has been placed with the Assistant Chief, Dr. Martha M. Eliot. A Maternal and Child Health Division, headed by Dr. Albert McCown; a Crippled Children's Division, headed by Dr. Robert C. Hood; and a Child Welfare Division, headed by Mary Irene Atkinson, have been established. The public health nursing aspects of the program are under the direction of Naomi Deutsch. A field staff of physicians, public health nurses, and social workers is being developed. Members of the staff have visited practically all the states to confer with state officials concerning the provisions of the Act and the cooperative services authorized.

Administration of the three types of aid for maternal and child health and child welfare services will be closely integrated, for we have learned that it is impossible to divide a child's life into separate compartments; physical and mental health are mutually interdependent. Locally, a broad base of county or district public health service and social service is essential. The maternal and child health program, to be successful, must be developed as part of a generalized service, with specialized consultant service provided. General policies governing advisory service to the states in the organization of public health nursing programs, which will be generalized in type but will make due provision for maternal and child health service, have been developed through consultation and agreement on the part of representatives of the Public Health Service and the Children's Bureau. In many areas somewhat similar relationships between generalized and specialized social services will be developed. Both generalized service and specialized service, at least of an advisory nature, are necessary if the needs of mothers and children are to be met. Close relationships will be maintained between the Child Welfare Division of the Children's Bureau and the Bureau of Public Assistance of the Social Security Board.

The care of the crippled child is an excellent example of the

need for coordination of medical, nursing, and social services. Locally, much of the work of locating and diagnosing crippled children will be carried on through maternal and child health services. Nurses will assist in follow-up after discharge from hospitals, and social workers will assist in determining financial need, developing plans for boarding or institutional convalescent care, when needed, and preparing the family for the child's return. Mental hygiene services should be developed, as opportunity offers, in connection with both the health and the welfare programs.

The Secretary of Labor has appointed four advisory committees to assist the Children's Bureau in the development of general policies. Their membership includes representatives of various branches of the medical profession, public health nursing, and social services. The committees include a general advisory committee and a special committee on each of the three parts of the social security program administered by the Children's Bureau. They met in Washington, December 17 and 18, 1935, and adopted reports dealing with general policies affecting the work. A subcommittee on maternal care is being organized and will meet at an early date.

It is recognized that the key to the success of the program lies in the character of the state and local agencies which will carry it out, a matter which is very largely within the control of the states themselves. Informed and active interest and cooperation of both professional and lay groups are essential if the objectives of the program are to be made a reality in terms of saving maternal and child life and improving child health and child welfare.

The federal social security program was conceived and drafted by those who believed that the heart of any social program must be the child, that in a larger sense all measures intended to help individuals and families withstand the major hazards of life are child welfare measures, but that in addition, certain special safeguards for children are necessary. The emphasis of the federal

program for maternal and child welfare is placed on children in rural areas, in areas suffering from severe economic distress, and among groups of the population in special need. In other words, federal funds and federal advisory services to the states are intended to stimulate the development of provision for the children who hitherto, for the most part, have been outside the reach of organized child health and child welfare agencies. The funds are not intended to replace money now being expended by states, local communities, or agencies supported largely by private gifts. They do not lessen the problems of financing and operating existing agencies, or the need for planning their programs so as to reach with effective service, in cooperation with other agencies, all the children in need of health care or social protection beyond the resources of their individual families to provide.

Development of this cooperative program is a natural outgrowth of the interests and activities of the Children's Bureau and of other agencies, public and private, which for a quarter of a century, more or less, have seen on the one hand the close relationship which exists between the health and welfare of children and the economic, social, and health conditions basic to their survival and growth, and on the other hand, the importance of mutual cooperative relationships between the federal government and the state agencies. Illness has long been recognized as one of the major causes of that poverty which persists in times of prosperity, as in times of depression. Moreover, as shown by studies made by the United States Public Health Service in cooperation with the Milbank Memorial Fund, the incidence of sickness appears to be greatest in families whose standards of living are seriously and somewhat suddenly reduced. For many years it has been known that infant mortality was, in some measure at least, an index of economic and social welfare. The earliest studies of the Children's Bureau, dealing with infant mortality in representative industrial cities, showed that low earnings and high infant mortality rates

went hand in hand. So much progress has been made in the last twenty years in developing more adequate methods of infant care in cities, that since 1929 the rural infant mortality rate, for the United States as a whole, has exceeded the city rate—a reversal of the previous relationship. In a number of cities, however, and in some sections of nearly all cities, infant mortality remains exceedingly high. Juvenile delinquency is one manifestation of the absence of mental and social health, and there is evidence indicating that areas in our large cities having high delinquency rates also have high infant mortality rates and high incidence of communicable disease.

In the field of the protection and care afforded dependent, neglected, and delinquent children, and activities intended to reduce juvenile dependency and delinquency, the Children's Bureau has made many state-wide and local studies at the request of agencies within the states, and has given advisory and consultation service with reference to legislation, studies, and administrative methods. These types of service have also been given in the fields of maternal and child health, child labor, and the development of methods of statistical reporting of social and health services. The ability of the Children's Bureau to give such services and of the states to make effective the standards generally accepted as necessary will be greatly enhanced by the new program. It will be possible to relate the work of the Bureau's established research and statistical divisions more closely to administrative needs for a sound basis of information on which state and local programs may be built, and to apply more promptly the findings both of studies and of cooperative demonstrations of actual methods and results of developing given types of services under varying conditions.

Plans for child health and child welfare work will naturally vary greatly, depending upon the needs and resources of the states, and the extent to which services have already been devel-

oped. Brief summaries of an approved plan for maternal and child health services, one for crippled children's services, and one for child welfare services, for the five-month period ending June 30 of this year, follow:

Maternal and Child Health Plan: This State, largely rural, with scattered population, few hospitals, and limited transportation facilities in many areas, has witnessed little decline in its maternal mortality rate over the past twenty years. The greatest need is reported to be for better facilities for adequate medical prenatal supervision which should not only benefit the mothers but should also decrease infant mortality. Recent surveys of malnourished children have also shown the need for more intensive health education in the home to prevent dental defects resulting from inadequate care and diet in infancy and early childhood.

Maternal and child health work has been carried on by the Division of Public Health Nursing and Child Hygiene of the State Bureau of Health. Upon receipt of federal funds under the Social Security Act, a new Division of Maternal and Child Health and Crippled Children will be created and its work will be closely integrated with that of the public health nursing division. The program will be an extension and expansion of present work which includes follow-up of prenatal cases, infants and preschool children in cooperation with local physicians, diphtheria and smallpox immunization, and classes in infant care, especially in rural areas and where no other nursing service is available. Under the new plan the area covered by these services will be extended and with the additional service of dental hygienists and a nutritionist and provisions for institutes and conferences, the work will reach a larger number of mothers and children.

Tentative plans for special demonstration service in two areas have been made. The areas selected for these demonstrations Hospital facilities are available, but neither area has local public health nursing services, and supervision of prenatal cases and are both rural with population largely in the low-income group. of well children has been inadequate due to financial need and

to lack of appreciation of the need of this work. The plans include employment of two well-qualified public health nurses, each to be responsible for an average of 200 prenatal cases a year. A case-finding campaign will be an important feature. Prenatal care will not be given beyond three visits unless the patient is under medical supervision. Provision will be made to have nurse assistance at time of delivery, and demonstration nurses will give postpartum care or supervision. At the end of one month the infant will be referred to the county field nurse. Demonstration nurses will also arrange for services of dental hygienists and nutritionist when and where necessary.

Plan for Services for Crippled Children: The administration of the crippled children's services in this State is to be carried out by the Crippled Children's Division of the State Department of Health under the immediate direction of an orthopedic nurse who has been specially trained for this work. The program will include the immediate care of acute cases of poliomyelitis; locating crippled children and diagnostic and follow-up clinics; follow-up work in homes by orthopedic nurses and social workers; the supplying and fitting of braces and appliances; hospital, convalescent, and special types of postoperative care. A plan for the development of a system of reporting congenital deformities will be worked out and put into operation as soon as possible.

A program of after-care for children who had had poliomyelitis was organized in 1914 and carried out in the Department of Health under the direction of consulting orthopedic surgeons. This program has recently been extended to include other types of crippling. As this is a rural state and until the present time without local orthopedic surgeons, arrangements for hospitalization of crippled children have been made with hospitals in nearby states which have excellent facilities for operative care. The location of these children has been accomplished through the cooperation of local medical and nursing groups and private organizations by means of diagnostic clinics. No accurate estimate has been made of the number of all types of crippled children in need of care in this State although it has been shown in reports of the Public Health Service that the

incidence of infantile paralysis in this area has been unusually great during the past few years.

The plan for extension of services for crippled children includes an increase in the number of diagnostic clinics to be held by competent orthopedic surgeons, especially in rural areas which previously have not been reached. A part-time orthopedic surgeon will be employed by the State Department of Health to assist with clinics, and under his direction a certain amount of operative work will be carried out in the State. Follow-up work for children seen in the diagnostic clinics or discharged from hospitals will be carried on by orthopedic nurses with field experience. An additional orthopedic nurse will be employed to extend these services. The plan also provides for the appointment of a medical social worker who will organize and supervise the social services needed in the crippled children's program, such as the determination of financial status of the family or an evaluation of the child's home from the point of view of the needs of a crippled child about to be discharged from the hospital. Cooperation with the various organizations in the State has been shown in the appointment by the Governor of a state advisory committee representing the groups interested in the different phases of the program.

Plan for Child Welfare Services: This State has for twelve years been laying the groundwork for an adequate structure for public welfare services. The plan for child-welfare services under the Social Security Act submitted by the State Department of Public Welfare was the first to receive approval by the Children's Bureau.

The activities to be undertaken under this plan combine new services with a strengthening and development of those already in effect. The State Bureau of Child Welfare is now responsible for general supervision of all cases involving children, including the social investigation of all adoption petitions filed, the licensing and supervision of child-caring institutions, the reception and care of a group of children committed to its custody through the juvenile courts, administration of the Aid to Dependent Children Act (the plan for which has been approved by the Social Security Board), regulation of boarding home care

of children, etcetera. The Bureau of Child Welfare serves the county staffs of child welfare through the Bureau of Field Service.

With funds allotted under Title V, Part 3 of the Social Security Act, the field staff of the State Department of Public Welfare is to be made adequate to serve smaller districts so that they may give consultant service to every county on special problems of child care, dependency, prevention of delinquency, protection of neglected or ill-treated children, and probation work, and so that they may encourage and strengthen children's agencies, public and private. Three trained and experienced case consultants, one a Negro, will be added to the field staff to give more intensive supervision of children's problems to the county staffs.

In order to give greater emphasis to community organization and recreational facilities for children, four selected areas, of four counties each, in different sections of the State, are to be used for demonstration purposes to develop such resources. General child welfare activities will be developed and recreation as a deterrent to delinquency will be stressed. One person will be assigned to each of these areas, one of them to be a Negro. In each area one county will be selected for intensive work. Cooperative arrangements have been established with an educational institution and with women's groups.

As funds do not yet permit establishment of a Bureau of Mental Hygiene, the plan provides for a psychiatric social worker to serve the Bureau of Child Welfare. This worker would also serve the Division of Foster Home Care and would be available to the special children's workers in the county departments of public welfare.

The whole plan aims to establish a coherent program beginning with State supervision and bringing the whole service down to a basis of intensive case work with the individual child who may come to the attention of the county unit.

MEASURING HEALTH NEEDS IN AN URBAN DISTRICT

by DOROTHY G. WIEHL

II. PREVENTIVE HEALTH ACTIVITIES IN RELATION TO SPECIFIC PROBLEMS[1]

THE adequacy of the public health clinic and nursing supervisory and educational activities in the 801 families surveyed in the Mott Haven Health District, New York City, before a district health organization was set up, can be measured most significantly when the services are considered in relation to the available evidence as to the prevalence of specific health problems in the families. The nurses are engaged primarily in the supervision of a few specific problems, although one might assume quite reasonably that in the majority of families, especially those that are economically less privileged, the public health nurse would find one or more health conditions for which her help and instruction would be of great value. The available services are directed to the care of those health problems which are brought to the nurses' attention through some type of public health activity, as, for example, the reports of physical defects of school children, of communicable diseases and of tuberculosis, or to the assistance of individuals who are referred by other agencies or refer themselves to a clinic, as is true in the case of most infant supervision. The present analysis is to determine to what extent the Health Department did give some supervision to families and individuals in the survey sample for the care of health needs which were or, from available sources, might have been known to the Department, and to determine the extent to which preventive health measures were provided from any source for the more common public health problems. The problems studied and re-

[1] From the Milbank Memorial Fund. The first paper which described the sample of families in the survey and reported on the extent of health service to the families was published in the January, 1936, issue of the *Quarterly*, XIV, No. 1, pp. 23-36.

ported on in the following pages include the correction of physical defects of school children, immunization against diphtheria, infant and maternal hygiene. The number of communicable diseases reported and the number of tuberculous families in the survey were too few for detailed study.

PHYSICAL DEFECTS OF SCHOOL CHILDREN

Health supervision was provided during the twelve-month period of study[2] to more families for the purpose of obtaining the correction of a physical defect in a school child than for the care of any other health problem. It has been shown that 5 per cent of all families received this type of health service and that these families were slightly more than half of the total number receiving any service. The adequacy of supervision for the correction of defects may be studied by considering the individual children who had some defect and the extent of the follow-up service given by the Health Department.

The records of the examination of school children by the school medical examiners were the source of information concerning the physical defects of children in these families which required some corrective treatment.[3] These records were supplemented by the school nurses' records of follow-up and corrections which had been made and by the families' statements concerning the correction of defects. To allow a reasonable amount of time for the nurse to follow up a defect and for the family to attend to its correction, we have omitted the records for children examined less than three months before the date of the investigator's visit. There were 116 children in the survey who had been examined from three to eleven months previous to the home visit and 74 had at least one physical defect which had been graded as in

[2] The families were visited between June and December, 1932, and the health services received in the twelve months preceding the date of the visit are the basis of this study.

[3] The name of every child of school age was checked against the records in the schools, not just those for whom the family informant had reported a defect. The results of all medical examinations on the child's record were copied, regardless of how long ago the examination had been made.

need of attention.[4] Although the number of cases is small, they should provide a fairly representative cross section of the situation in this district for all but a few higher income families with respect to the prevalence of physical defects found by the school medical examiner and the extent to which they were followed up and corrected.

Follow-up Service. The school nurses made visits to the homes of 26 of the children with defects, or 35 per cent. They advised the parent about the needed care for the child and in some cases assisted in making arrangements for obtaining medical care. In addition, the nurse held a conference at the school with five of the children or with parents, making a total of 42 per cent of the children for whom there was some follow-up service on record. The nurse made one home visit to two-thirds of the cases and never visited more than twice to secure the parents' interest in correcting a physical defect. The records seem to indicate that most of the children who were likely to receive any special attention from the nurse were given supervision within three months

Table 1. Follow-up service by the school nurse given to children with physical defects in a period of three to twelve months after the school medical inspection, and in families of various incomes, in the Mott Haven District, 1931-1932.

Economic Status of Family	Number of Children Examined	Children With One or More Defects Graded 3 or 4		Children With Defects Receiving Follow-Up Service	
		Number	Per Cent	Number	Per Cent
All Incomes	116	74	63.8	31	41.9
Relief	26	19	73.1	8	42.1
Poor	39	27	69.2	10	37.0
Moderate	35	19	54.3	9	47.4
Unknown	16	9	56.3	4	44.4

[4] Only defects recorded as 3 or 4 on the medical examination card have been counted. A four-fold grading system with 1 as satisfactory was supposed to be used, but many times the defect was not classified on the card, and simply the word "teeth," "tonsils," etcetera, was entered. None of these ungraded defects has been counted, although in some instances the nurse made a follow-up visit and a correction was reported. The failure to grade the defects so that the nurse will know which are in most urgent need of correction is a serious lack in the record.

of the examination.[5] Thus, when the children are classified into three groups according to the months elapsed since the medical inspection, the following percentages which had received follow-up service from the school nurse are obtained: three to six months, 38 per cent; six to nine months, 42 per cent; nine to twelve months, 47 per cent.

The extent of the follow-up service provided to children of different economic status[6] is shown in Table 1. The number of children in each income group is too small to have much significance but there is no evidence that children were selected by the school nurse for follow-up because of any knowledge of the economic status of the family. However, it should be remembered that the study was made in a period of declining wage rates and loss of employment and many families had become "poor" or had relief only in recent months. There was, nevertheless, a much higher percentage of children with physical defects needing attention among the lower income groups than the higher.

Table 2. Follow-up service by the school nurse given to children with specific defects in a three to twelve-month period after examination in the Mott Haven District, 1931-1932.

Physical Defect Graded 3 or 4	Number of Children Having Specified Defect	Children Given Follow-Up by the School Nurse	
		Number	Per Cent
One physical defect:	54	18	33.3
Nutrition	23	5	21.7
Tonsils	14	5	35.7
Teeth	11	6	54.5
Eyes	4	2	50.0
Cardiac	2	0	0
Two or more defects	20	13	65.0

[5] In the twelve-month period of this study there were nursing visits reported for five children with physical defects who had been examined more than one year previously and for whom there was no record of any earlier follow-up service.

[6] Income was computed for the twelve-month period preceding the investigator's visit to the family and the following classifications are used: "Relief," families receiving welfare for any part of the period; "poor," families with less than $1,400 income; "moderate," those with $1,400 or more. Most families of unknown income seemed to belong in the moderate group.

The type of defect noted and the presence of more than one serious condition seem to have had considerable influence on the selection of cases for follow-up, as is shown in Table 2. When poor nutrition was the only condition reported, the nurse had given special attention to only 22 per cent of the children, but in the case of teeth and eye defects one-half of them had had follow-up supervision. Of the twenty children with more than one physical defect, 65 per cent had had nursing supervision, but it is not possible to determine whether any specific defect had more influence on the nurse than another. It seems probable that the fact that the Health Department provided some facilities for correction in the district (six dental clinics and one eye clinic) was the chief reason for the nurses' selection of a relatively large proportion of eye and teeth defects for follow-up service.

Corrections. A report of a correction of at least one defect or of the condition being under treatment was given either on the nurses' records or the investigator's record for nineteen children, or 26 per cent of those with a defect needing attention. That the small percentage with corrections is not the result of including children for whom only three to six months had elapsed since their examination is shown by the fact that five of the twenty-one children in this most recently examined group reported a correc-

Table 3. Correction of physical defects of school children in relation to follow-up service by school nurse, in the Mott Haven District, 1931-1932.

Status of Child With Respect to Service from the School Nurse	Number of Children With Defects	Children With a Defect Corrected	
		Number	Per Cent
TOTAL CHILDREN	74	19	25.7
Follow-up at any time:			
Nursing contact	31	14	45.2
None	43	5	11.6
Follow-up before correction:			
Nursing contact	28	11	39.3
None	46	8	17.4

tion. Furthermore, for a group of thirty-three children with serious defects found on examination in the year previous to that included in our study, the school and nursing cards recorded a correction for only nine, or 27 per cent.

The per cent of children for whom treatment or a correction was reported was much higher among those who had had some follow-up service than among those without this service, the percentages being 45 and 12, as is shown in Table 3. But for three children[7] the parents had started or made the correction before the nursing supervision was given and if these are transferred to the group "without follow-up," the per cent of children with corrections in this group becomes 17 and that for corrections apparently related to the follow-up service is 39. Obviously, the benefits of the school medical examinations are not realized unless the correction of defects is carried out. A follow-up service by the nurses which reached most families promptly might be expected approximately to double the number of corrections. On the other hand, the follow-up service given to these families had resulted in a correction being made in less than one-half the cases. The reasons for failure to secure corrections should be studied in order to improve the effectiveness of school health work.[8]

Table 4. Physical defects corrected or under treatment from three to twelve months after examination for a group of 74 school children in the Mott Haven District, 1931-1932.

Type of Defect	Number of Defects Found	Number Corrected	Per Cent Corrected
TOTAL DEFECTS	96	23	24.0
Tonsils	29	5	17.2
Teeth	21	7	33.3
Nutrition	38	7	18.4
Eyes	5	3	60.0
Cardiac	3	1	33.3

[7] It should not be inferred that the follow-up of the three children was wasted effort that might have been avoided. In one case, there had been only a school conference at which the nurse discovered that a child had obtained glasses for a vision defect. For the other two children, there had been home visits, and since poor nutrition was one of the conditions needing attention, instruction of the mother was a needed service even though the associated defect had been corrected.

[8] A discussion of the reasons for failure is included in "Physical Defects—The Pathway to Correction." American Child Health Association, 1934.

Of the ninety-six different conditions for which these seventy-four children needed attention, there was evidence that 24 per cent had been corrected or were under treatment, as is shown in Table 4. Since few corrections were reported except for children who had received follow-up service, the differences in the rates for correction of specific defects are very similar to those discussed for follow-up of specific defects. The percentages of defective tonsils and of poor nutrition corrected were very low, only 17 and 18 per cent respectively, and since these were the most prevalent conditions they affect the general average of corrections very much. The correction of a nutrition defect takes a long time for some children and also is not readily recognized unless a re-examination was made and, therefore, such corrections may not have been completely reported. But if all nutrition cases are excluded, the corrections of other defects amounted to only 28 per cent of the defects reported.

DIPHTHERIA IMMUNIZATION

Immunization against diphtheria was reported for 55 per cent of all children in the survey under fifteen years of age. For children aged 6 to 14 years, the per cent was 64, but for preschool children, as shown in Table 5, it was 38 per cent. These are the total immunizations done at any time prior to the investigator's visit, and include all children who had been given three doses of toxin-antitoxin or toxoid. There was no information on the number tested to determine whether immunity had developed. Diphtheria is a more serious menace to the preschool child than the school child, and, although the immunization of 38 per cent of

Table 5. Immunizations against diphtheria received by children any time prior to the survey in the Mott Haven District, 1932.

Age Group	Children Immunized Against Diphtheria		Number of Children
	Per Cent of Total	Number	
UNDER 15 YEARS	54.8	675	1,231
0-5 years	38.3	173	452
6-14 years	64.4	502	779

those under six years of age represents a noteworthy accomplishment, an increase in the immunizations at very young ages should be a constant objective of the Health Department.

The date of immunization was indefinite for so many children that it was not possible to determine how many had been done in the twelve-month period of our study, but at least one-third of the immunizations had been done in 1931 or 1932. The survey was begun six months after the close of the intensive city-wide campaign conducted during a three-year period by the Diphtheria Prevention Commission.[9] This campaign apparently had met with marked success in the Mott Haven district.

The agency which administered the prophylaxis is shown in Table 6, using the family as a basis rather than the child. One or more children under fifteen years of age in 62 per cent of the families had received immunizing treatments. Fifty per cent of the families had had a child or children immunized at a school clinic, 45 per cent at some other clinic, and 16 per cent by a private physician. A family with more than one child may have had one child inoculated at school and another child at a clinic, or any other combination, but only 10 per cent of the families re-

Table 6. Agency used by families in different income groups for immunization of children against diphtheria in the Mott Haven District.

Agency Giving Immunization	Number of Families					Per Cent				
	All Incomes	Relief	Poor	Moderate	Unknown	All Incomes	Relief	Poor	Moderate	Unknown
School clinic	169	24	61	50	34	50.0	34.8	53.0	49.5	64.2
Other clinics	151	48	47	39	17	44.7	69.6	40.9	38.6	32.1
Private physician	55	8	17	23	7	16.3	11.6	14.8	22.8	13.2
Total families[1]	338	69	115	101	53	—	—	—	—	—

[1] Since a family might take one child to one agency and another child to a different agency, the sum of the families using each agency is greater than the number of families with a child immunized. The total number of families is the base for computing percentages.

[9] A record of this campaign is available in a published monograph, "Saving Children's Lives." Diphtheria Prevention Commission, The Department of Health, City of New York, 1932.

ported more than one source of this service. In the majority of families all children apparently had been immunized at the same time.

When the use of different agencies is considered in relation to the family income, some differences stand out. Among relief families, 69 per cent had had a child immunized at a clinic, as against from 32 to 41 per cent of families in other income groups. This is no doubt the result of a larger percentage of relief families having taken their children to clinics for other health needs. Families classified in the "moderate" income group had used a private physician much more frequently than any other group, 23 per cent compared with 12 to 15 per cent for the other groups. The proportion of families which had service from some source did not vary according to income.

INFANT HYGIENE

Health supervision of infants and instructive service to mothers in the Mott Haven district were provided by the Health Department through two Baby Health Stations and home visits by nurses, through the Henry Street Nursing Service, and hospital infant clinics. The extent of the educational and supervisory service rendered obviously can be measured only if account is taken of services by all the agencies. The Baby Health Stations were open to children up to two years of age, most of the Henry Street nursing care was given to new-born infants, and one of the two hospitals in the district admitted to its infant clinic only babies born in the hospital.

Extent of Service. The computation of the proportion of an infant population which had any health supervision in the first year of life offers some difficulty when the records available do not follow a specific group through infancy. In this study, the record of service received is for the twelve months previous to a given date and, obviously, this twelve-month period coincides with the

period of infancy in only a very few cases. It includes anything from the entire twelve months to a few days, either at the beginning or end of the infant period, for the population under two years of age at the date of the visit, and it is entirely possible that all this group might have service. The periods of observation for different infants cannot be added together and the equivalent years of infant life used as a base population to which may be related the total number of infants with service while under observation, because infant supervision is not a single contact but is usually a continuing service over a varying number of months.[10] An approximation to the method of following a specific group through infancy has been used in the present study, by using a changing population for each month of infant life[11] and counting for each month the number of infants who received their *first* health service. The number of infants under observation in each month of life is practically constant and the new cases at each month may be added together and related to the average infant population to obtain the percentage of infants which had health supervision of any amount sometime between birth and age one year.

One-half of the infants in the survey sample received health supervision from some agency by the end of the first year of life, on the basis of services reported or on file for 121 individuals observed from one to twelve months of the infant period, and an

[10] This represents what is done when the number of infants receiving health service from any agency in a calendar year is related to the number of births in the year to determine the per cent of infants which had service. The number of infants with service should include only those to whom the service given was the first ever received, in other words, an absolutely new case, not a "new case this year." When service is continued, as in the case of infant supervision, the later months of an infant's life cannot be considered independent of the earlier months of life. The method of obtaining the percentage of infants which received service is described in detail because often it is computed inaccurately.

[11] For example, the infant population observed for the third month of life is all infants in the study whose third month was from 0 to 12 months previous to the home visit, or those aged 3 to 15 months. The number of infants in this group who had their *first* service in the third month is used as typical of the new cases reached in the third month. The complete history of the service received since birth was copied for every child under two years of age and enables us to classify the infant as a new or old case in each month.

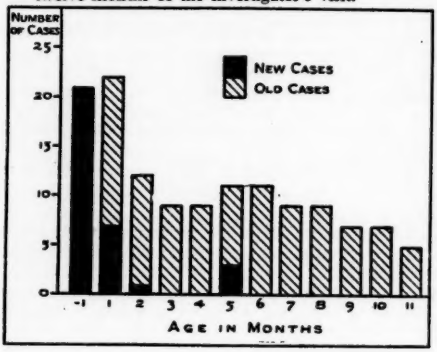
average of sixty-one infants under observation in each month of infancy. The Health Department had given service to 28 per cent, as shown in Table 7, and all of these had been to one of the infant clinics. According to the policy of the Department, the nurse should visit the homes of infants attending clinic in order to understand the family situation, but in this series of cases, the nurse had visited about 65 per cent of the clinic cases. No home visits were reported for infants not having first attended clinic. Health supervision was given by Henry Street nurses to eighteen, or 30 per cent, of the infants and only four of these were in the group which attended a Health Department clinic.

Table 7. Health services to an average group of sixty-one infants in the Mott Haven District, 1931-1932.

Agency Giving Service	Number of Infants	Per Cent[1]
All Agencies	32	52.5
Health Department	17	27.9
In clinic	17	27.9
Home visit by nurse	11	18.0
Henry Street Visiting Nurse Service	18	29.5
Other: clinic	3	4.9

[1] Per cent of 61 or the average infant population under observation for each month of infant life (*see* footnote 11).

Fig. 1. Number of infants supervised for the first time and number with previous service given supervision in each month of infancy by either an official or voluntary agency among an average population of 61 infants, which each month was composed of those infants who had passed through that month of life within twelve months of the investigator's visit.



Preventive health care is most effective in the early months of infancy and, as shown in Figure 1, most of the infants which received service from the different agencies came under supervision in the first or second month of life. Few new cases were reached after the third month, and the number of old cases given service in each month continued at about the same level

until the ninth month of life. Although the Health Department clinic was open to children up to two years of age, only five children aged one to two years at the date of the survey had attended after age one.

The agency which gave service in the different months of life is shown in Figure 2. Most of the infants cared for in the first month of life had home supervision by nurses from the Henry Street Nursing Service. These received new-born care, which usually was combined with postpartum care for the mother. Very few of these infants had supervision after the second month. Nearly all those under care after the neonatal period attended the Health Department clinics.

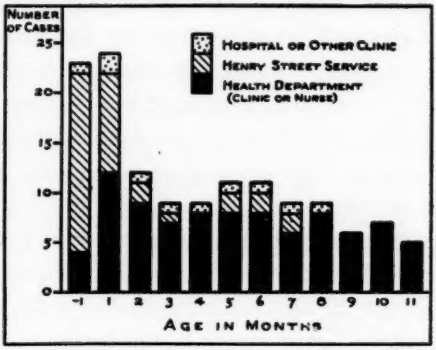


Fig. 2. Number of infants given health supervision in each month of infancy by various agencies among an average population of 61, which each month was composed of those infants who had passed through that month of life within twelve months of the investigator's visit.

Volume of Service. Infants with some health supervision at the Health Department clinics made frequent revisits to clinic, usually one or two per month, and the thirteen infants who were registered at clinic before the age of three months made an average of 9.8 visits up to the age of six months.[12] In the latter half of the infant period, revisits were less frequent and more than half the mothers had discontinued attendance before the infant was a year old. The average number of visits for the entire twelve months was 12.5[13] for the thirteen infants whose records were available up

[12] Service records at the clinic were copied after the investigator's home visiting was completed, and the clinic records were complete up to six months of age for all infants, regardless of age at the home visit.

[13] The average number of visits for a group of infants followed from birth to age one year may differ widely from that obtained by dividing the total visits to a clinic in

(Continued on page 156)

to one year of age. The infants given care by Henry Street nurses had an average of seven visits. This was an intensive service, including bedside care for most, and the practice apparently was to give seven to ten visits within a short period following birth. Cases with fewer visits usually had been delivered in a hospital.

Economic Status and Service. Although the number of infants in the different income groups was too few to have much significance, the difference in the proportion with service is of some interest. The per cent of infants in "poor" or "relief" families which had attended a Baby Health Station was 37.5 as against 9.5 per cent of the infants in families of "moderate" or unknown income. Henry Street nurses gave care to 33 and 24 per cent of infants in each of these two broad income groups. The service by Henry Street nurses to one-fourth of the infants of "moderate" incomes is no doubt influenced by the fact that some had this care because they were industrial policy holders of the Metropolitan Life Insurance Company.

It is the purpose of the Health Department to make facilities for preventive health supervision available for all infants who do not have this care from private physicians. Each mother was asked specifically when and how often she had taken the baby to the doctor for examination or general care and not because of illness. Of the fourteen mothers in the "moderate" or unknown income group with babies from three to eleven months old, seven said they had taken the baby to the doctor once or twice in the second or third months of life. Of the thirty-one mothers in the "relief" and "poor" group, seven had taken their babies to a private physician up to three months of age, and none of the older infants who had not been to a physician in the first three months had any medical attention in later months. If this small sample of infants is at all typical, there was little preventive medical care given to

a twelve-month period by the number of infants who attended clinic. The two averages are comparable if the number of infants in the latter computation includes only those who had their first clinic contact in the period.

infants in the low-income families, and the 37.5 per cent who were attending an infant clinic represent not more than half of those who had not had infant supervision from a private physician.

MATERNAL HYGIENE

The health supervision of maternity patients both with respect to medical care and to instruction and assistance by a public health nurse was provided in the Mott Haven district by agencies other than the Health Department. Since this is an important health problem now generally accepted as within the scope of public health responsibility, the health department should know the status of maternity care in the community and take the leadership in coordinating services provided by different agencies and

Table 8. Prenatal care reported for a sample of maternity cases, classified according to the type of delivery care received, in the Mott Haven District, 1931-1932.

Attendant and Place of Delivery	Total Cases	Medical Prenatal Care Reported by Maternity Patients			Prenatal Care by Visiting Nurse[2]	Per Cent With Specified Prenatal Care	
		Physician[1]	No Medical Care	Unknown		Physician	Visiting Nurse
TOTAL	61	48	10	2	19	81.4	32.2
Private physician	31	24	5	2	8	82.8	27.6
At home	18	13	4	1	8	76.5	47.1
In hospital	13	11	1	1	0	91.7	0.0
Hospital physician							
In hospital, pay	11	9	2		3	81.8	27.3
In hospital, free	14	12	2		6	85.7	42.9
Hospital or clinic physician, in home	3	3	0		2	100.0	66.7
Midwife[3]	2		1				

[1] Private patients at delivery had prenatal care from a private physician; patients delivered by a hospital physician had prenatal care at a prenatal clinic.

[2] All cases visited by a nurse except one also had medical supervision. Nursing service was given by Henry Street except for two cases.

[3] One of the two midwife cases reported prenatal care by the midwife; the other had none.

in bringing the patient and services together. It should assure the provision of adequate facilities regardless of what agencies render care.

Data were collected on the extent of the medical and nursing care received by women in the survey who bore a child less than twelve months before the investigator's visit. The mother's statement on medical care is the only source of information, but the records of the service given by Henry Street nurses were transcribed. The type of prenatal and delivery care reported by the sixty-one maternity patients is summarized in Table 8.

Delivery Care. Medical care for 46 per cent of these births was provided through the ward and clinic facilities of hospitals and only 51 per cent were under the care of a private physician. Two women in this series were delivered by a midwife. Delivery care was given free to 28 per cent of the women and 18 per cent paid a small sum for hospital care but no medical fee. If this sample is fairly typical of at least 75 per cent of the families in the district, as it seemed to be, then there is a large community load to be cared for in this district. It seems likely that about one-third of all births were cared for as free or part-pay hospital patients.

Less than half of the private physicians' patients (42 per cent) were delivered in a hospital. The sample is overweighted with low-income families, and the hospitalization of private patients in the district is much higher, probably from 60 to 70 per cent since 80 per cent of all births in the district were in a hospital.

Prenatal Care. Ten of the fifty-nine women who gave a complete report on their maternity care said they had no care before confinement. Except for the two midwife cases, the highest proportion without prenatal care is found for the private physicians' patients who were delivered at home. Four of the seventeen patients, or nearly 25 per cent, had not seen the physician previous to the time of confinement. No prenatal care was reported for 14 per cent of the ward and dispensary patients.

The preventive value of prenatal care is dependent upon early medical supervision. The per cent of women in this series who had received any medical prenatal care up to a specific month of pregnancy is shown in Figure 3 and the per cent under the care of a private physician and of a hospital clinic is given also. Only 20 per cent had registered for prenatal care before the sixth month of pregnancy, but the per cent increased rapidly in the sixth and seventh months. It can be seen in Figure 3 that the increase in those two months was especially rapid for clinic cases and the delay in registering for care was greater for the private physician patients.

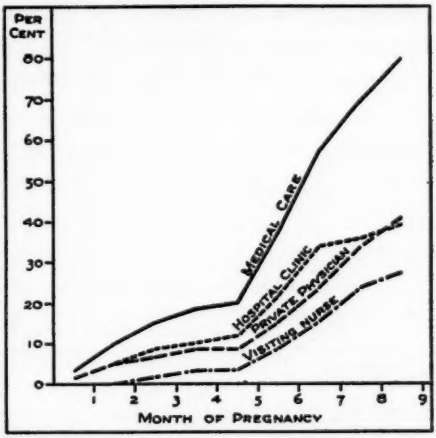


Fig. 3. Per cent of women who had received some medical prenatal care and some nursing care in or previous to each month of pregnancy, for a sample group of 61 maternity patients.

The period of pregnancy in which prenatal care was begun is shown in Table 9 for cases classified according to the type of delivery care. A larger proportion of the women who had free care than of those who were private patients began their medical supervision early enough in pregnancy to give opportunity for good prenatal care. Of the ward and dispensary patients, 48 per cent attended clinic in the sixth month or earlier, compared with visits to the physician by 31 per cent of all private patients and 17 per cent of those delivered at home.

In this series of cases, nearly all women who began care early made return visits fairly regularly. The average number of visits to a prenatal clinic by the twenty-two women reporting a definite number was 6.9 and only three of them made fewer than four

Month of Pregnancy	Number of Cases under Specified Care Which Began Prenatal Care in Stated Month					Per Cent of Cases under Specified Care Which Began Prenatal Care in Specified Month				
	Private Patient			Hospital Case	Henry Street Nurse	Private Patient			Hospital Case	Henry Street Nurse
	Total	Hospital Delivery	Home Delivery			Total	Hospital Delivery	Home Delivery		
TOTAL CASES	29	12	17	27	16[1]	100.0	100.0	100.0	100.0	100.0
Before the 5th	5	4	1	6	2	17.2	33.3	5.9	22.2	12.5
5th or 6th	4	2	2	7	3	13.8	16.7	11.8	25.9	18.8
7th or 8th	11	5	6	8	9	37.9	41.7	35.3	29.6	56.3
9th	4	0	4	2	2	13.8	0.0	23.5	7.4	12.5
No supervision	5	1	4	4	—	17.2	8.3	23.5	14.8	—

[1] Excludes one case for which the month was not stated.

Table 9. Month of pregnancy in which prenatal care was begun by patients cared for by a private physician and by a hospital, and month in which nursing supervision started for a sample of maternity cases in the Mott Haven District, 1931-1932.

visits; but the average number of prenatal calls to a private physician by the twenty-two women reporting was 4.1 and eleven of them made fewer than four calls. This suggests that the need for education on preventive measures for expectant mothers is greater for the women in low-income brackets who went to their own physician than among those who used available clinic services. This may be partly the result of an economic barrier which keeps the private patients from making frequent visits for prenatal care and partly the result of education of the clinic group at previous births and the desire to be registered at the hospital for delivery care.

Assistance of a visiting nurse in carrying out the physician's instructions, in getting supplies, and making arrangements for delivery, is of inestimable value to patients of limited income or slight knowledge of maternal hygiene, nutrition, and related subjects, and this service should be available to most pregnant women. It is a service which, as Mustard has pointed out, does not compete with the physician in charge but in which the nurse

"supplements, assists, acts as his representative."[14] Nurses of the Henry Street Nursing Service made home visits in the prenatal period to seventeen women, or 28 per cent of the sixty-one maternity patients; and two others had home visits from a representative of the hospital clinic. Those with service from a Henry Street nurse were about equally divided between clinic patients and private physician cases who were delivered at home.

The nursing contact was not made early enough in pregnancy to assist in bringing the patient under early medical supervision, since only five of the women were visited before the seventh month. As the nursing supervision started late in pregnancy, nine of the 14 cases, for which the number of home visits was known, had from one to three visits, and the other five had from four to eight visits. One of the most difficult problems involved in improving prenatal care is to find the cases early in pregnancy.

Postpartum Care. A postpartum examination from one to two months after confinement should be included as part of an adequate maternity service. Among fifty-four women reporting, less than half had returned to the physician or clinic to be examined.

Table 10. Number and per cent of maternity patients who reported a postpartum examination, for a sample of cases in the Mott Haven District, 1931-1932.

Classification of Patient	Number of Women	Postpartum Medical Examination		Per Cent Which Had an Examination
		Yes	No	
TOTAL CASES	54[1]	25	29	46.3
Private patient	28	15	13	53.6
In hospital	12	12	0	100.0
At home	16	3	13	18.8
Hospital patient, part pay or free	26	10	16	38.5

[1] Excludes five women who failed to report on postpartum examination and two women delivered by a midwife.

[14] Mustard, H. S., M.D.: AN INTRODUCTION TO PUBLIC HEALTH. New York, The Macmillan Company, 1935, p. 173.

Wide differences were indicated for different types of patients, as shown in Table 10; all of the private patients delivered in a hospital reported a postpartum examination but only 19 per cent of the patients delivered at home by a private physician had been examined. This latter group had had the least amount of both prenatal and postpartum care.

All patients given nursing care in the prenatal period by Henry Street nurses were followed up in the postpartum period.

HOW MUCH WORK CAN A RURAL PUBLIC HEALTH NURSE DO?[1]

by MARIAN G. RANDALL, R.N.

THE growing interest in rural health administration and practice brings the specific problem of planning for the type and number of personnel needed to carry out a county or rural health district program. One phase of this problem is concerned with the size of the staff needed to extend the activities of the health program to the people in the area who need these services. It becomes a matter of knowing the amount of work that can reasonably be expected from the individual worker who carries out the standards of a program under given conditions. This knowledge is limited, but some information is available from eight counties in the United States which may indicate, in a general way, an answer to the problem. In this paper an attempt is made to use these records of experience.

It has frequently been pointed out that the professional qualifications of rural health workers are of primary importance. The quality of the personnel largely determines the quality and standard of the work performed. The standards set up for qualifications for health department personnel vary considerably in different localities, however, partly because the nature of the problems and the stage of development of health work differ and partly because differences exist in rates of pay, permanence in tenure, and facilities for training and supervision. Little or no information on this phase of personnel practices in county health departments exists and further study is needed. Our discussion here is perforce confined to the numerical ratio of public health nurses to the population, the evidence available of the volume of services rendered by the public health nurse alone or as assistant in the clinic or school, and an estimate of the extent to which any services are

[1] From the Milbank Memorial Fund.

given to those who may need service, under given conditions in the eight counties.

While we are here concerned only with the work of the public health nurse, it must be recognized that her activities are only a part of the total health program and that they are determined largely by the policies and program of the health department and depend upon the stage of development of the various phases of health work in the area. This integration of the nurse in the program as a whole is shown quite clearly in the following illustrations of the amount of home visiting, clinic work, and school work which comprise the year's work of a nurse in different counties. If the county health department program is developed to include clinics and school work, the nurse has less time to spend in home visiting. The nurse is an agent of the health department and her work is necessarily governed by the scope and character of the total program.

THE COUNTIES STUDIED

It must be pointed out in the beginning that the data are limited, and it was necessary to make a few estimates from the available figures. The areas selected for study were limited by the amount of information available. They are: Cattaraugus County, New York; Rutherford County, Tennessee; Brunswick-Greensville, the Bi-County Health Unit in Virginia; Wexford County, Michigan; Scott County, Kentucky; Crawford County, Ohio; Greenwood County, Kansas; and Limestone County, Alabama.[2] In all of these

[2] The sources of information are: for Cattaraugus County, the Annual Reports and special studies made by the Milbank Memorial Fund; for Rutherford County, CROSS SECTIONS OF RURAL HEALTH PROGRESS, by H. S. Mustard, M.D., The Commonwealth Fund, New York, New York; for Brunswick-Greensville, special articles prepared by Pearl McIver, R.N., from studies made by the United States Public Health Service and published in the *Public Health Reports;* and for the other counties, A STUDY OF RURAL PUBLIC HEALTH SERVICE, edited by A. W. Freeman, M.D., for the Committee on Administrative Practice of the American Public Health Association, published by The Commonwealth Fund, New York, New York. While all these sources are based on reports of a few years ago, they were used because of the need for comparable information. More recent reports from some of the counties show very little change in the health programs, and very little change in the volume of work included in the nurses' activities.

counties there was some home visiting by the public health nurse, some clinic service in all but Limestone County, and routine medical examinations of school children in all but the Brunswick-Greensville area and Greenwood County. While the types of services rendered make these areas fairly comparable for study, differences exist in the amount of work done in each type of service and in each county. One reason for this is the emphasis which a particular county may put upon one phase of its program. Another reason is the difference in the number of nurses on the staff of the health departments.

POPULATION PER NURSE

It has been recommended that there should be one public health nurse to every 2,000 population.[3] Thus the number of people in the district served by a public health nurse may be used as a unit for measuring the adequacy of public health services. This is shown in Table 1 for the eight counties studied. Since we are primarily interested here in the activities per nurse, only the population per nurse is given. It should be recognized, however, that where there is only one nurse in a county, as is true in all but three of the counties studied, certain administrative duties must be carried on by her which in the more highly organized counties are taken care of by the director or supervisor.

Table 1. Population per nurse in eight counties of the United States having organized county health departments.

County Number[1]	Name of County	Thousands of Population per Nurse
I	Cattaraugus, New York	5
II	Rutherford, Tennessee	6
III	Wexford, Michigan	6
IV	[2]Scott, Kentucky	14
V	[2]Brunswick-Greensville, Virginia	17
VI	[2]Crawford, Ohio	18
VII	[2]Greenwood, Kansas	19
VIII	[2]Limestone, Alabama	36

[1] These numbers will be used to designate the counties in the remainder of the discussion.

[2] There is only one nurse in each of these counties.

[3] Hiscock, I. V.: COMMUNITY HEALTH ORGANIZATION. New York, The Commonwealth Fund, 1932, p. 155.

As Table 1 shows, there is considerable variation in the size of the units of population served by a nurse. By comparison with the general practice throughout the country, there is for most of the areas less than the average unit of population per nurse.[4] But the limitations in meeting the known needs of these counties studied are even more significant when it is recognized that they are counties having more than the average amount of public health nursing service.

VOLUME OF WORK PER NURSE

The most commonly used method of reporting upon the activities of the public health nurse is to give the number of home visits made, the number of clinic visits made by the patients, and the number of medical examinations given to school children. The home visits are made by the nurse alone, while the clinic and school services are activities in which she assists the physician and renders her own special services in the form of health teaching. The volume of these three services per nurse per year in each of the counties studied is shown in Table 2.

Even with all the differences in various factors inherent in the problems of each county, considerable similarity in the volume of work per nurse is evident. In County I, the nurse made fewer

Table 2. Volume of work per nurse per year in eight counties.

County	Total Home Visits	Total Clinic Visits	Total Examinations of School Children
I	1,588	89	948
II	1,711	243	491
III	1,455	301	1,157
IV	1,835	139	2,871
V	991	197	—
VI	1,085	172	800
VII	1,186	328	—
VIII	1,175	—	2,822

[4] According to the study of rural health work made under the auspices of the Committee on Administrative Practice of the American Public Health Association, which is used as a source of information in this paper, there is an average of one nurse to every 20,000 population in the counties having organized county health departments, but only about one-sixth of the counties of the United States have county health departments.

home visits than in County II, but she assists with more than twice as many examinations of school children. In County VII, she makes practically the same number of home visits as in County VIII, but she gives service for over 300 clinic visits and no school service, instead of a large number of school examinations and no clinic service. Thus, even when allowing for variations in size of territory and traveling conditions, the health program undertaken, standards or quality of service, and differences in size of population served, records of experience may be used in estimating the approximate volume of activity of a rural public health nurse. It is suggested, therefore, that approximately 1,400 home visits, 200 clinic visits, and 1,000 school examinations per nurse per year may be used as an index of volume until more definite information is made available.

EXTENT OF SERVICE

Only an approximation of the extent to which a given amount of service reaches the people in a rural area can be estimated from the information available. The usual method of reporting the nurses' visits and the cases visited *for a calendar year* tells the amount of work done but does not give the basic data to determine the number of individuals with a specific health problem, such as pregnancy, or the number of individuals of a given age group, such as infants, which at some time had continued supervision over a period of time unrelated to the calendar year. If the extent of service is computed on this basis, the results, in terms of the proportion of the people served, may be in considerable error, especially if it happens that some old cases received continued service during part of the specified calendar year studied. Since records are not available from most areas for cases who received any service from the first to the last of the specific health problem involved, such as the prenatal period, the first year of the infant's life, and the like, estimates are made for illustrations of relative differences, with recognition of their limitations.

Maternity and Infant Service. No prenatal clinics were provided in any of the counties studied.

The reported births for a year have been used to represent the total maternity and infant problem. Table 3 shows an estimate of the per cent of the maternity and infant cases who received home visits from a county nurse. (See footnote 1 under Table 3). Considerable variation is indicated in the eight counties. In County III, the figures suggest that this part of the program was emphasized in an unusual degree; two-thirds of the cases received services during the prenatal period, with an average of three visits per case visited; nearly one-half of the cases received visits from the nurse in the postpartum period; and two-fifths of the infants received an average of six visits per case. In County IV, it is estimated that not more than 18 per cent of the cases received nursing services in any of the three periods, although in the prenatal

Table 3. Home visits per nurse per year to maternity and infant cases in eight counties.

County	Nursing Services for Prenatal Cases			Nursing Services for Postpartum Cases			Nursing Services for Infants		
	No. of Cases Visited	Average Visits Per Case	Per Cent of Births Visited	No. of Cases Visited	Average Visits Per Case	Per Cent of Births Visited	No. of Cases Visited	Average Visits Per Case	Per Cent of Births Visited[1]
I	27	3.0	29.3	23	3.2	25.0	68	5.0	38.8
II	38	3.6	33.3	42	2.6	37.8	97	3.2	41.7
III	87	3.3	66.5	63	3.0	48.1	49[2]	6.0	37.9
IV	57	8.0	17.2	50	1.5	15.1	58[2]	1.3	17.5
V	95	1.5	18.3	48	1.4	9.3	86	1.4	11.1
VI	5	1.4	1.7	289	1.0	95.7	40[2]	5.9	13.2
VII	49	2.0	10.6	—	—	—	12[2]	3.7	2.6
VIII	39	2.1	4.0	53[3]	1.0	5.4	71[2]	3.8	7.2

[1] Records of infants visited are usually not kept in such a way that the number of infants who had any service from birth to one year of age can be reported or accurately computed. The ratio of the number of infants visited in a calendar year to the number of births registered gives only a rough approximation of the per cent of the infant population which was visited. The ratio so obtained is a maximum. The extent of the error is greater the more continued and regular the service is throughout the period of infancy, since the more frequent the service the greater the opportunity of including service to old cases under exposure for a short period in the specific calendar year.

The same principle is involved in estimating the per cent of cases receiving prenatal services, but the probable error is reduced by the shorter period for which most prenatal cases are carried.

[2] Estimated from information given in Dr. Freeman's Study of Rural Public Health, p. 160, which states visits per 1,000 births and average visits per infant visited.

[3] An additional 15 cases were registered but not visited in the home.

period the cases visited received an average of eight visits per case. In County VI, however, only 2 per cent of the prenatal cases received any services, averaging 1.4 visits per case, while 96 per cent of the postpartum cases received one visit each.

To the extent that the number of visits indicates better or continued supervision, the average visits per case may be used to express the quality of service given. When the amount of service is limited there is always a problem of visiting fewer cases and giving continued supervision or extending services to a greater number even though the amount of service is limited. In a tax-supported service the nurse is obliged to assume certain responsibilities regardless of other conditions. The nurse is often obliged to give limited services, such as represented by one home visit to maternity cases, to as many as possible in a large population, and the effectiveness of the results often may be of doubtful value. It is suggested that the reason is not inherent in the practice of attempting to give as many cases as possible at least some supervision, but in the more fundamental practice of assigning a nurse to a unit of population far too large for her to serve adequately.

Infant and Preschool Clinic Service. Another illustration of the amount and extent of nursing service for a particular activity is

Table 4. Child health conference services per nurse per year for infants and preschool children in eight counties.

County	Clinic Registrants	Average Visits per Child	Per Cent of Infants and Preschool Population Attending Conferences[1]
I	51	1.4	8.8
II	118	1.7	21.8
III	86	2.6	15.3
IV	—	—	—
V	14	1.0	0.5
VI	48	3.0	3.3
VII	312	1.0	15.0
VIII	122	—	2.5

[1] Infant and preschool population here estimated from reported births and from the 1930 Federal Census.

shown by the services given in child health conferences for infants and preschool children. All but County IV have some conference service for young children, but, as Table 4 shows, there is wide variation in the amount of service given. Only in one county is there more than 20 per cent of the infant and preschool population who receive the medical examination and health conference facilities of the county. In five of the counties less than 5 per cent of the young children receive any clinic services.

Total Services. In Table 5, a summary of the estimated total services per nurse per year is shown for each county. From the sources of information previously quoted, it was possible to include in this summary nurses' home visits for prenatal and postpartum maternity services, for infant, preschool and school services, for adult health supervision, and for tuberculosis services and other communicable disease services.[5] The total clinic services

Table 5. Summary of services per nurse per year in eight counties.

County	1,000 Population per Nurse	Nurses' Visits to Homes			Clinic Services			Physician's Examinations of School Children	
		No. of Cases Visited[1]	Average Visits Per Case	Per Cent of Population Visited	No. of Cases Attending Clinics	Average Visits Per Case	Per Cent of Population Receiving Clinic Service	No. of Children Examined	Per Cent of School Population Examined
I	5	535	3.0	11.9	66	1.3	1.5	948	100.0
II	6	712	2.4	12.9	149	1.6	2.7	491	38.6
III	6	433	3.4	7.7	157	1.9	2.8	1,157	100.0
IV	14	765	2.4	5.3	74	1.9	0.5	2,871	90.8
V	17	640	1.5	3.8	136	1.5	0.8	—	—
VI	18	734	1.5	4.1	78	2.2	4.4	800	29.5
VII	19	609	1.9	3.2	328	1.0	1.7	—	—
VIII	36	575	2.0	1.6	—	—	—	2,822	59.8

[1] Prenatal and postpartum counted as separate cases since it was not possible for all but three counties to show number of cases receiving each of these services; communicable disease cases also counted as separate cases since information was lacking for number of cases which also received health supervision services. The material has been made comparable for each of the counties included.

[5] In counting the number of cases for this summary, prenatal and postpartum were counted as separate cases since it was not possible for all but three places to show the exact number of cases receiving each of these services. Communicable disease cases are also counted as separate cases since it was not possible from the information available to show which of the communicable disease cases also had health supervision services. The statistics are comparable for all eight counties.

are largely comprised of child health conferences and tuberculosis diagnostic clinics. Since the conference services varied somewhat in respect to the provision of services for children of different age groups, and comparable figures for the total number of reported cases of tuberculosis in each county were not available, the total population figures were used to illustrate a rough estimate of the extent of clinic services.

School examinations, as here used, are only those in which a physician has made the examinations. It is known, however, that in County V, where no school examinations are reported, the nurse makes frequent school inspections and sends children to a physician if conditions warrant it. This may also be true in County VII. It is undoubtedly true that in all eight counties the nurse makes frequent visits to the schools which are not shown in this summary of services. Other activities, such as teaching mothers' clubs, instructing classes in home hygiene and care of the sick, inspection of midwives, and the like, are not included in this summary.

The population per nurse is expressed in units of 1,000. As the population per nurse increases, the per cent of the population receiving home visits decreases. This would be expected. And if the program includes medical examinations of a large per cent of the school children, a relatively small amount of clinic services are included in the nurse's work. This would also be expected. Some evidence bearing on this point is presented in Table 5. It appears that, if a county nurse is serving a population of five or six thousand, the records of experience show that she can make home visits to between 8 and 13 per cent of the population. If a higher quality of service is given, as shown by repeated visits, the service is extended to fewer people. A nurse in County III visits 8 per cent of the population but gives them an average of 3.4 visits per case. In County I a nurse visits 12 per cent of the population, with an average of 2.8 visits per case. If the nurse is

assigned to serve a population of 14,000 or more, she will probably visit in the homes of only 5 per cent or less of this population. In County VIII, where the nurse serves a population of 36,000, she visits only 1.6 per cent of the population, gives no clinic service, and assists with the examination of 60 per cent of the school children.

Similar facts are shown for clinic and school services. In only one county is there more than three per cent of the population given clinic supervision. While three of the counties give medical examinations to 90 per cent of the school children, two of the counties give none, and two give them to less than forty per cent of the children.

Summarizing the three types of service, it will be noted that if a relatively high per cent of service is given in one type of health supervision, there is a relatively small per cent of service given in one or both of the other two types of service. For example, in County IV, the nurse makes more than the usual total number of home visits, but there is no clinic service required of her. Only just so much work can be covered with a limited health personnel, and the program is often largely confined to one phase of health service, as here illustrated.

Even with the limited information available, it is evident that until an adequate number of rural public health nurses are provided, the services of the county health departments can be given to only a small per cent of the people of the county. Is it true economy in county health administration to continue to give limited health services to only a few of the families in rural areas?

RECENT TRENDS IN BIRTH RATES AMONG FOREIGN AND NATIVE-WHITE MARRIED WOMEN IN UP-STATE NEW YORK

by CLYDE V. KISER[1]

TEN or fifteen years ago it would have sounded absurd to say that there is probably little basic difference between the birth rates of foreign and native-white stocks in this country. That the foreign-born were very prolific was one of the arguments often stated in behalf of more rigid immigration restrictions. Now that such legislation has been effected there is little popular concern over birth rates of the foreign-born. The question has also been neglected by students of population partly because of the diminishing numerical importance of the foreign-born, but mainly because sufficient data are lacking. Nevertheless, an adequate and accurate comparison by nativity of recent fertility trends would throw much light on the nature of the recent declines of the general birth rate.

For purposes of such a comparison, the Annual Reports of the New York State Health Department provide unusually good data insofar as numbers of births are concerned. From this source it was possible to secure for each year from 1917 to 1934 the numbers of legitimate[2] births in New York State exclusive of New York City according to the color, nativity, and age of the mother. The accuracy of the rates presented in these pages depends in large part upon the accuracy of the population estimates,[3] and such

[1] From the Milbank Memorial Fund.

[2] The numbers of legitimate and illegitimate births were reported according to the age and nativity of the mother. In order to avoid the factor of differences in proportions married, the comparison was restricted to legitimate births to married women of the specified age groups.

[3] The numbers of married women by age and nativity were secured from the Federal Census reports for 1910, 1920, and 1930. The estimates of the numbers for inter-censal years were made by application of the arithmetic method. There are good reasons to believe, however, that the projection of the 1920-1930 changes of foreign or native population would lead to erroneous estimates. Net immigration into this country has

(Continued on page 174)

estimates are particularly hazardous for the foreign population in post-censal years.

In spite of the limitations, however, the rates presented here are at least suggestive of the incidence of the decline in the general birth rate and are indicative of present-day comparisons in the fertility levels of foreign and native populations. The data were plotted on semi-logarithmic scales in order to portray the rates of change rather than the absolute changes in fertility during the period under study.

It is commonplace knowledge that the general or "crude" birth rate has declined rapidly in recent years. In Up-State New York, the annual total number of births per 1,000 total population declined from 21.3 in 1920 to 14.1 in 1934, a decrease of approximately one-third. Our interest is to determine how much decline has taken place in the foreign-white as compared with the native-white population. Care must be taken, too, to ascertain how much of the decline in the fertility rate of the foreign population is real and not simply the automatic result of immigration curtailment. From the nonstandardized rates in Table 1 and Figure 1 it will be noted that the number of legitimate births per 1,000 foreign-born white married women of child-bearing age declined from 195 in 1920 to 81 in 1934, a decline of 58 per cent. The corresponding rates among native whites were 142 and 106, a decline of only 26

been *nil* during the past several years. It also appeared probable that the increases of natives through inter-state migration were much less than those during the boom decade, 1920-1930. The following procedure was used in estimating the foreign and native populations in post-censal years:

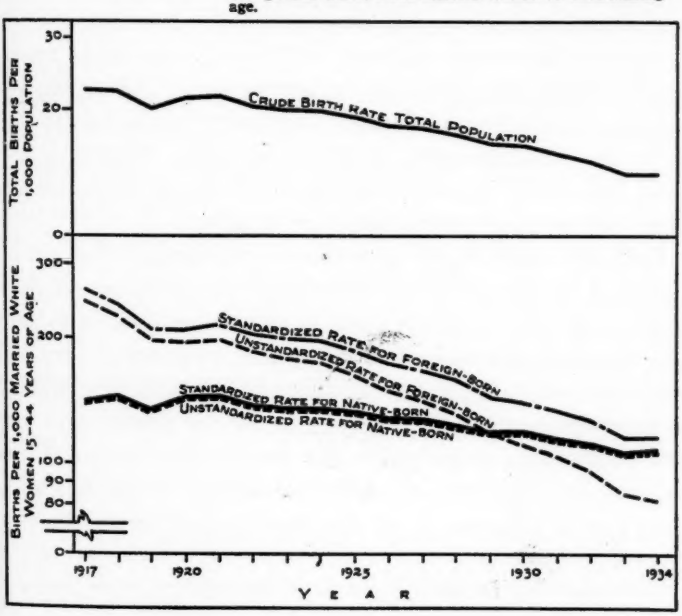
It was possible to secure from the 1930 Census a five-year age distribution, by color and nativity, of the total single, married, widowed, and divorced females in Up-State New York. Assuming that there had been no losses or additions to the cohort of females 10-40 years of age in 1930, it was possible to say that those reported 10-14 years of age in 1930 would constitute the number 15-19 years of age in 1935, those reported as 15-19 in 1930 would be 20-24 in 1935, etcetera. Hence it was possible to build up an assumed age distribution as of 1935 for each nativity group. Average annual changes were then computed between the actual number within a specific age group in 1930 and the assumed number in 1935. From these data age distributions of females 15-44 were computed as of July 1, for successive years 1930-1934 inclusive. The numbers obtained were then restricted to married women by application of the proportions married in specific age and nativity groups as computed from the 1930 Federal Census reports for this area.

Type of Rate and Nativity of Wives	Births per 1,000 Wives		Per Cent Decline
	1920	1934	
Nonstandardized Rates			
Foreign	195	81	58.4
Native	142	106	25.6
Foreign per cent higher than native	+36.8	−23.5	
Standardized Rates			
Foreign	209	115	44.9
Native	144	107	25.9
Foreign per cent higher than native	+45.2	+7.9	

Table 1. Legitimate births per 1,000 married white women of child-bearing age in 1920 and 1934, by nativity, New York State exclusive of New York City.

per cent. On their face, the nonstandardized rates might appear to indicate that the fertility level of the foreign-born is now consid-

Fig. 1. Annual birth rates, Up-State New York, 1917-1934.
Upper Scale: Annual number of births per 1,000 total population.
Lower Scale: Nonstandardized and standardized birth rates per 1,000 foreign and native-white married women of child-bearing age.



Age	Foreign-Born		Native	
	1920	1934	1920	1934
15-44	100.1	100.1	100.0	100.0
15-24	11.9	5.3	16.7	17.4
25-34	43.9	35.6	43.4	42.3
35-44	44.3	59.2	39.9	40.3

Table 2. Percentage age distribution of foreign-born and native married white females of child-bearing age, 1920 and 1934, New York State, exclusive of New York City.

erably lower than that of the native whites, and that it has been lower since the year 1929.

The fallacy of the above conclusion, however, is apparent from a comparison of the 1920 and 1934 age distributions of the foreign and native married women. Since immigration laws have gone into effect the existing foreign female population has been deprived of young married or marriageable recruits from abroad and consequently there has been a marked decrease in the proportions in the younger and more fertile age groups. From Table 2 it will be seen that while the age distribution of the native-white married women remained virtually unchanged from 1920 to 1934, there was a decided aging of the foreign group. Clearly, it is of basic importance to control the factor of age in comparisons of birth rates among foreign and native groups.

In Table 1 and Figure 1, birth rates standardized for age are presented for foreign and native-white married women of child-bearing age. The same age distribution has been used as a standard[4] for computation of rates for each nativity group and for each year under study. When ages are thus held constant, the two points of chief significance are: (1) The rate for the year of 1934 computed for foreign wives was only 8 per cent higher than that of native wives; (2) the rate of decline among the foreign wives from 1920 to 1934 was 45 per cent while that among native wives was only 26 per cent.

[4] The standard used was taken from the 1930 Census reports and is based on the age distribution of all urban white married females 15-44 years of age in the United States.

The birth rates among foreign and native women of the same specific age groups afford an additional valid comparison. As shown for three age groups in Table 3 and Figure 2, the comparisons yielded by these data are significant in two respects:

1. In 1920, the percentage excess of foreign birth rates over those of native groups in Up-State New York ranged from 18 per cent among the youngest women to 106 per cent among the oldest women. In 1934, the foreign excess ranged from 2 per cent among women 25-34 years of age to 21 per cent among women 35-44.

2. From 1920 to 1934, the rates of decline in the birth rates of foreign-born women of Up-State New York have been least (28 per cent) among the youngest and greatest (61 per cent) among the oldest. This association of rate of decline with age is also apparent to a much less degree among the native whites. The decrease in the annual birth rate among the native wives under 25 years of age was 23 per cent while that among the oldest group was 33 per cent.

In considering the above results several factors should be kept in mind. First of all, of course, is the uncertainty of the popula-

Table 3. Legitimate births per 1,000 married white women in 1920 and 1934, by age and nativity, New York State, exclusive of New York City.

Age	Births per 1,000 Wives		Per Cent Decline
	1920	1934	
Under 25			
Foreign	375	271	27.6
Native	318	245	23.0
Foreign per cent higher than native	+17.9	+10.9	
25-34			
Foreign	240	121	49.7
Native	160	119	26.1
Foreign per cent higher than native	+49.7	+2.0	
35-44			
Foreign	102	40	60.5
Native	50	33	33.0
Foreign per cent higher than native	+105.5	+21.0	

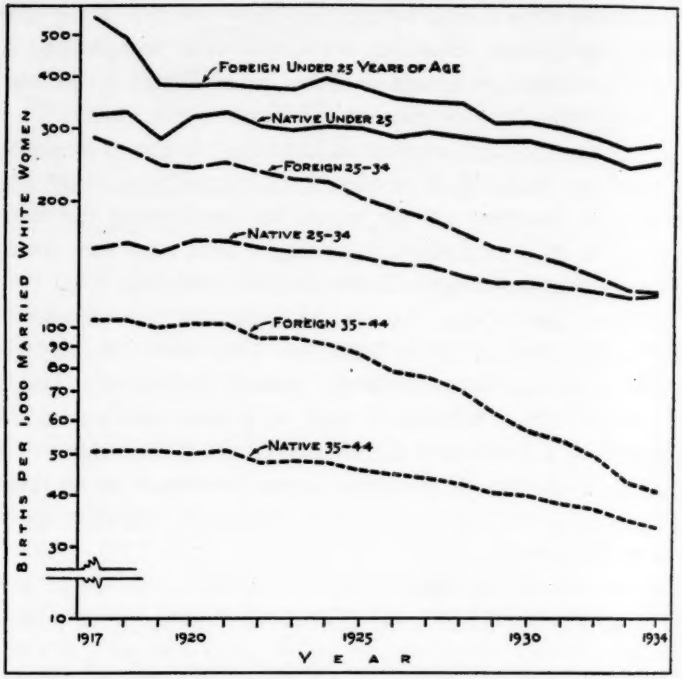


Fig. 2. Annual number of births per 1,000 married white women of specified age and nativity, Up-State New York, 1917-1934.

tion estimates in post-censal years. Next, age differences may persist as a result of the rather broad age groupings used. Then there are factors such as proportions residing in urban districts, proportions in the laboring classes, and proportions who are Catholics. All of the above factors, however, do not influence birth rates in the same direction; so their composite effect would probably not be large, especially insofar as comparisons of trends are concerned. Smaller but more refined bodies of data secured from field surveys in urban areas are now in the process of analysis. These will permit partial control of the above factors in age and nativity comparisons of fertility trends.

Year	Number Married Women 15-44 Years of Age		Annual Birth Rates per 1,000 Married Women 15-44 Years of Age			
			Nonstandardized		Standardized	
	Foreign	Native	Foreign	Native	Foreign	Native
1917	152,358	469,126	242	140	260	142
1918	154,385	474,256	225	143	241	145
1919	156,413	479,384	197	132	210	133
1920	157,863	487,977	195	142	209	144
1921	158,731	500,028	197	144	213	145
1922	159,596	512,080	185	136	203	137
1923	160,461	524,132	178	134	198	135
1924	161,329	536,183	175	134	198	135
1925	162,195	548,235	162	131	186	132
1926	163,063	560,286	149	126	174	127
1927	163,928	572,338	141	126	167	127
1928	164,793	584,390	131	122	159	123
1929	165,661	596,441	117	117	144	118
1930	164,870	608,166	111	117	140	118
1931	159,114	618,830	103	113	133	114
1932	153,359	629,495	95	110	125	111
1933	147,604	640,157	84	105	115	105
1934	141,847	650,821	81	106	115	107

Appended Detailed Table A. Nonstandardized and standardized birth rates among foreign and native married white females 15-44 years of age, New York State, exclusive of New York City, 1917-1934.

Year	Under 25		25-34		35-44	
	Foreign-Born	Native	Foreign-Born	Native	Foreign-Born	Native
1917	557	322	285	154	103	50
1918	491	326	268	159	103	51
1919	379	280	244	150	99	50
1920	375	318	240	160	102	50
1921	379	325	248	160	102	51
1922	374	301	235	153	94	47
1923	369	294	225	152	94	48
1924	391	301	221	150	90	47
1925	372	297	203	146	86	45
1926	352	284	191	140	78	44
1927	344	291	181	139	76	43
1928	341	285	167	132	70	42
1929	306	277	153	127	62	40
1930	307	278	149	127	56	39
1931	298	264	140	124	53	38
1932	283	257	132	121	49	37
1933	263	239	122	117	42	35
1934	271	245	121	119	40	33

Appended Detailed Table B. Legitimate births per 1,000 married white females by age and nativity of mother, New York State, exclusive of New York City, 1917-1934.

EPIDEMIOLOGY OF WHOOPING COUGH IN A RURAL AREA*

by RALPH E. WHEELER, M.D., D.P.H.

IV. CONTACT AND SPREAD

IN preceding sections of this report the incidence of whooping cough was discussed from the point of view of the survey area as a whole or of broad subdivisions of the area. It was observed that the average annual incidence for all ages was about twenty per thousand and that cases tended to occur at somewhat later ages on farms than in villages. The incidence of recorded overt attacks was slightly greater among females. A general confirmation of these observations was secured in the data on histories of prior attack. In examining the proportions without history of prior attack it was noted that these seemed to vary inversely with the concentration of population, suggesting that a study of individual relationships or contacts might prove profitable.

1. *General Character of Contacts in the Survey Area.* It will be necessary to differentiate rather sharply between the relationships in the farm areas and in the villages, for the contact possibilities differ widely.

In the farm areas outside the villages, the houses were quite widely separated and children frequently had to go some distance to find playmates. The child of preschool age, therefore, seldom had contacts outside his own home, and his chief risk of contracting whooping cough came from contact with an infected older brother or sister. The child of grade-school age had the added hazard of school attendance. He usually went to a small one-room neighborhood schoolhouse with four to twenty schoolmates. Although his contacts were thus still limited, there were a

* From the Milbank Memorial Fund. The first two sections of Dr. Wheeler's monograph were published in the October, 1935, issue of the *Quarterly*, xiii, No. 4, pp. 366-380; the third section in the January, 1936, issue of the *Quarterly*, xiv, No. 1, pp. 81-91.

number of factors which increased the risk of infection because the contact relationships of country schoolmates are as a rule much more intimate than are city ones. These are, however, by no means limited to contact in the schoolroom. The children frequently ride or walk to school together, lunch at the same table in the schoolroom in winter or during inclement weather, play together after school for a time, and visit some one of the children's homes in a body on their way back. It is thus difficult, if not impossible, to differentiate actual school from play contact—a fact which should be borne in mind in the course of the more detailed analysis of contact factors below. There was one parochial grade school in the area taking children from considerable distances, but in the main farm grade-school attendance was limited to the immediate neighborhood. During school vacations, the grade-school child had contacts almost as limited as his younger brother, although he occasionally rode in with his father to a near-by village or city or did local errands for his family.

The farm child of high-school age, if he attended, always went to one of the village schools. When whooping cough was epidemic in the village school, such a child when susceptible frequently brought the infection back to his home. The paucity of other contact in these high-school children is manifested by the fact that their infection usually did not spread to other households in the vicinity of their homes. Theoretically, an attacked farm child attending high school in the village could start an outbreak in a local grade school by infecting a younger brother or sister attending one, but no such satellite outbreaks were observed.

The child of high-school age not going to school usually worked on the parental farm, although boys sometimes hired out as farm laborers and sometimes lived on distant farms where their contacts were usually household ones except in harvest time.

There was one farm custom which may have been responsible for not a little of the periodic importation of whooping cough

into the area. Farmers are frequently great visitors, and on Sundays and holidays they often leave the care of livestock to a neighbor while they take the whole family off to visit more or less distantly located friends and relatives or into the nearest large city for the day. Whooping cough is known to have entered the area on two occasions when families under observation either made or received visits in this way, and it is not unlikely that the failure to trace local contacts in successive outbreaks of whooping cough could be thus explained more often than the fragmentary contact records would indicate.

Farm relationships are thus relatively limited in this area during the younger ages but are rather peculiarly intimate. In rural regions where both the grade and the high schools are centralized, it is probable that outbreaks of the disease would be much more widely distributed.

The relationships in the villages, on the other hand, resemble much more those in urban centers than those on the farms, for even in these small villages of the study area (none of which contained more than a thousand inhabitants) individual contacts were far more numerous and of a more varied sort. They doubtless, however, do represent a transition from rural farm to urban, for even in the largest of the three villages it was not always as possible as in the cities for a preschool child to find playmates of compatible age and temperament, so that at least this stage of life may remain relatively free of extrafamilial contacts.

Because the etiological agent of whooping cough is known to be short-lived outside the body, this discussion emphasizes particularly the direct contacts made in rural life. It seems doubtful whether fomites are of great importance in the spread of whooping cough in the country districts. The possible rôle of carriers has also been disregarded, as the meager evidence at hand[23] indicates

[23] Kline, Edmund K.: Whooping Cough Plates in a Public Health Laboratory *American Journal of Public Health*, 1933, xxiii, Part I, p. 493.

that they are also not an important factor in disseminating the disease.

It is now possible to outline the actual course of whooping cough attacks during the survey period as a preliminary to a study of the relative importance of the various contact factors.

2. *Geographical and Chronological Occurrence of Whooping Cough.* It was observed in Section II that there were four major periods of whooping cough prevalence during the three-year survey period. Each of these periods showed four to twelve geographically distinct occurrences either limited to one household or grouped in localized outbreaks involving two or more homes. The location of attacked households in each of the four periods of prevalence is shown in Figure 7. Each neighborhood occurrence, whether sporadic or an actual small outbreak, has been lettered in the order of the appearance of the primary case in time, but it should not be concluded that each succeeding one resulted from contact with the previous one. Whooping cough frequently appeared in townships bordering on the survey area and must frequently have been imported from outside by some chance contact or by visiting. Because of the importance of the complex of contact possibilities inherent in school attendance, the location of each of the country grade schools has been indicated by a small "S" and the location of the village schools (combining village grade and district high school) by an "S" in heavy type. There were three of these latter, one in West Valley Village (which also had a parochial grade school) in southeast Ashford, one in Ellicottville Village in southwest Ellicottville, and one in Great Valley Village in northern Great Valley. Households of which one or more cases were attacked while attending the indicated school are shown in black. Those which had no cases attending school are indicated by a dot and a circle. The majority of these latter families included only cases in children of preschool age, but a few included cases in children of school age although not

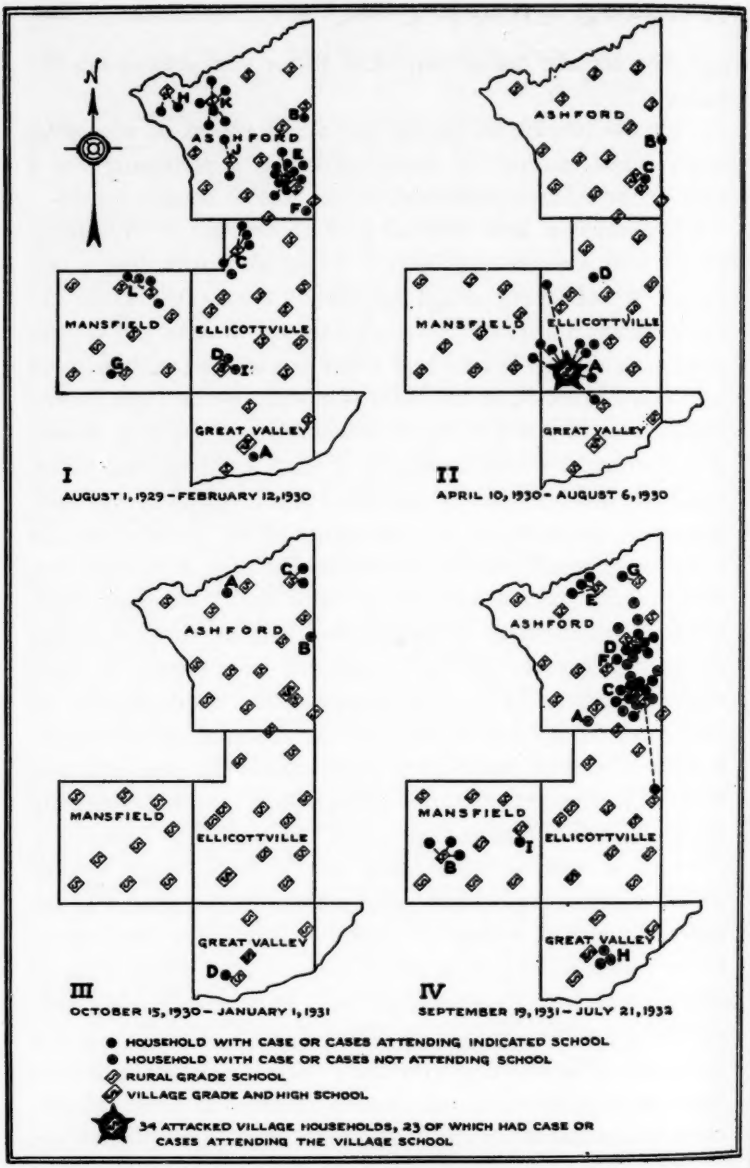

N
ASHFORD
MANSFIELD
ELLICOTTVILLE
GREAT VALLEY
I
AUGUST 1, 1929 – FEBRUARY 12, 1930
II
APRIL 10, 1930 – AUGUST 6, 1930
III
OCTOBER 15, 1930 – JANUARY 1, 1931
IV
SEPTEMBER 19, 1931 – JULY 21, 1932
HOUSEHOLD WITH CASE OR CASES ATTENDING INDICATED SCHOOL
HOUSEHOLD WITH CASE OR CASES NOT ATTENDING SCHOOL
RURAL GRADE SCHOOL
VILLAGE GRADE AND HIGH SCHOOL
34 ATTACKED VILLAGE HOUSEHOLDS, 23 OF WHICH HAD CASE OR CASES ATTENDING THE VILLAGE SCHOOL

Fig. 7. The sequence of neighborhood occurrences in each of the four periods of whooping cough prevalence, Cattaraugus Morbidity Survey, 1929-1932.

attending because school was not in session. The dates given for each period in Figure 7 are those of the onset of the first and of the last cases recorded for the period. As no occurrences were noted in Humphrey or the southern half of Great Valley township, Figure 7 does not show these portions of the survey area.

In general it will be noted that the outbreaks in the country grade-school districts tended to be localized in extent, although sometimes contiguous school districts were attacked during the same period, suggesting a certain amount of infective contact between them or infection from a common source. In spite of the occasional spread between school districts, however, a relatively small proportion of the total number of school districts showed attacks during the entire survey period. The village school outbreaks, of which the best example is shown in II:A, were much less localized. This is because the village schools include not only village grade pupils but high school pupils from all the surrounding farm grade-school districts as well. However, the winter outbreaks in the village grade and high school in Ashford (I:E and IV:C) tended to be localized because the high school is a small one and because winter road conditions in this high-school district often made it necessary for children living at a distance to lodge in the village itself. In the latter of these (IV:C) the coincident outbreak in the parochial grade school involved two households well outside the village limits.

It will be observed that attacked households without cases attending school are scattered among the larger school outbreaks and undoubtedly acquired the infection largely by casual neighborhood contact. The factor of school attendance is so universal that it can seldom be ruled out in any given occurrence, but there appear to be two small outbreaks (I:L and IV:H) in which neighborhood contact alone seems to have been responsible for the spread, giving rise to very limited outbreaks. A high proportion of these households without cases attending school are seen

to have been isolated occurrences even when (as in the apparently independent occurrences I:D and I:I) they were located in a neighborhood which, as shown by subsequent outbreaks, contained many susceptible children.

First Period (Figure 7:I). The first cases of whooping cough recorded in the survey occurred in a household in Great Valley Village (A). The next occurrence to be recorded was in northeastern Ashford (B) where seven children were attacked. The cases in both of these first two families occurred among children of school age but not attending because of the summer vacation. The next occurrence was a small school district outbreak (C) in northern Ellicottville, school having meanwhile begun. Next were recorded cases in preschool children in a household of Ellicottville Village (D). The next cases were noted in a household in West Valley Village (E). The children were attending school when attacked and the infection spread to a limited number of village and farm homes in the vicinity. While this outbreak was in progress, a case occurred in a neighborhood in southern Ashford (F). There was also recorded in southern Mansfield (G) one of the occasional sporadic occurrences in a child attending school. The disease next appeared in northwest Ashford (H) in a school district and another sporadic occurrence was recorded in Ellicottville Village (I). This second Ellicottville Village occurrence took place more than two months after the first and has, therefore, in the absence of other known cases in this village, been considered a new infection from outside the neighborhood. Two more school district outbreaks were next recorded in Ashford (J and K), and, finally, an outbreak in northern Mansfield (L) in a small hamlet. As Mansfield had been quite heavily attacked within the previous twelve months, it is possible that a good many of the school children had acquired immunity.

Second Period (Figure 7:II). Two months elapsed before another case was recorded in the area. It is possible that one or more atypical cases may have been missed and that the Ellicottville Village epidemic (A) was directly related to the previous outbreaks, but in the absence of definite evidence it has

been necessary to consider it as having arisen as a new importation from outside the area. The first case occurred in a child attending school and the outbreak was at first limited to school children. Thirty-four village households were attacked and nine farm homes. There were, during this outbreak, three other sporadic occurrences in the area (B, C, and D) of undetermined origin. A little over two months now elapsed without a recorded case.

Third Period (Figure 7:III). This period was really one of endemic whooping cough. After two sporadic household occurrences in northern Ashford (A and B), a small school district outbreak of eleven cases in only two households made its appearance. This same school area was attacked again in the following period. One sporadic household occurrence was also recorded in Great Valley (D). Like the Mansfield area, this part of the survey region had also been quite heavily attacked by whooping cough, and it is possible that others in the district were immune.

Between the third and fourth periods there was an interval of nine months during which no cases were recorded.

Fourth Period (Figure 7:IV). This began on September 19, 1931, with a case in a household in southern Ashford (A), the child having been infected while visiting relatives in a large city sixty miles away. The next occurrence (B) was a small school outbreak observed in western Mansfield which may well have originated independently. The disease spread thence to West Valley Village (C) in a definitely ascertained manner. A member of one of the attacked Mansfield households lived and worked as a hired man on a farm home near West Valley Village. He acquired whooping cough on a visit to his family in Mansfield and gave it to children on the farm where he was employed. These, in turn, were pupils in the West Valley high school and gave it to schoolmates. When it became general in the village, the local parochial school was also attacked. Infection was next carried to school districts (D, E, and F) north of West Valley where cases had previously occurred among children not attending school without causing outbreaks, and attacked again the school in northwest Ashford (G) which

was, by this time, pretty well immunized. It also appeared in the form of a small localized outbreak in Great Valley Village (H), the second in which school attendance as a possible disseminating factor could be definitely eliminated. The final occurrence of whooping cough was in a school family in Mansfield (I). No cases were noted in the survey area after July 21, 1932.

3. *Relative Importance of Contact Factors.* Because the recorded data on the sources of infection for the survey cases are so fragmentary, it is necessary to obtain information as to the relative importance of these various contact factors indirectly. It is felt that this can be done with a very good degree of accuracy from the regional and chronological outline just given. The conclusions from a study made in this way must necessarily be somewhat general and tentative, but they can be checked by the observations of the staff which lived in this area for three years while doing the field survey work and by somewhat more detailed studies of epidemics and contacts which were carried on simultaneously with the survey in attacked neighborhoods outside the survey area.

Of the total of 280 cases, 34, or 12.1 per cent, had dates of onset such that they were very probably the original cases in their respective neighborhoods. It is suspected, from such contact records as are available, that a fairly large proportion of these cases acquired their infection while visiting or being visited by an infectious case. In one case a farm laborer is known to have introduced the disease into the household of his employer, whence it spread very widely.

Once introduced into the neighborhood, whooping cough may be considered to spread locally in two ways. The first of these is general neighborhood contact, here called "vicinal" contact for brevity. This includes relationships entered into at play, while on errands, and during local visiting; in short, the activities of the

child when not attending school. Definitely in this category were thirty-eight cases, or 13.6 per cent of the total recorded cases. This is a strikingly small proportion and one which will require further explanation below.

The second mode of spread of whooping cough within a neighborhood is school attendance. In all, sixty-six, or 23.6 per cent of all the cases, attended a school in which there was known to have been an infective case.

As explained above, this does not necessarily mean contact *in* school, but the whole series of relationships into which a child is brought when he goes to school. The specificity of this category may be considered open to grave question in view of the fact pointed out above, that schoolmates are very likely to be playmates, and consequently also subject to vicinal contact. It would be difficult, if not impossible, to differentiate these two factors in any given case; however, there are certain facts which would suggest that school attendance in a community deserves separate mention as a mode of spread. Thus, sixteen of the twenty-nine neighborhood occurrences just discussed began in households where one or more cases attended school. Of these sixteen, eleven gave rise to local outbreaks involving one or more other homes in the immediate neighborhood. Furthermore, the primary case in these other homes was almost invariably a school child. Of the thirteen occurrences noted as beginning in households with no case attending school, on the other hand, only two involved other homes in the immediate vicinity. As none of the four homes with cases of school age but not attending started a local outbreak, there would appear to be some grounds for suspecting school attendance of very materially aiding in the neighborhood dissemination of whooping cough.

The fact that farm children, attacked in the course of attendance at village high schools, usually fail to spread the disease among other homes in their vicinity is an observation which indi-

cates that casual neighborhood or play contact has a relatively minor rôle in disseminating whooping cough on farms. When the dates of onset of such cases, even though on neighboring farms, are compared, it will often be found that they may occur six weeks or more apart. Rather striking also is the low proportion of attacked households without cases attending school in connection with the farm outbreaks. Less than one-fifth of the attacked farm homes belonged in this category, while more than a third of the village homes had no direct relation with school. This observation tends to confirm the general remarks made above on the unimportance of neighborhood contact in regard to the spread of whooping cough in the farm areas and of its somewhat greater importance in the villages.

The relationships discussed above have all been extrafamilial, and the discussion thus far has therefore been limited to primary cases in households. There remains one final relationship to touch upon: household contact. In order to differentiate between primary and secondary cases in households, a minimum interval of only one day has been selected. This was done in part because it was felt that the incubation period of whooping cough could occasionally be as short as forty-eight hours. However, the interval does not, within limits, greatly affect the number of primary cases, as only seven cases would be changed from secondary to primary were the interval four days instead of one.

By the one-day criterion, a total of 142 cases, or 50.7 per cent, were attributed to household contact. There is every reason to believe that, with the single reservation noted in the discussion of the interval selected to differentiate primary from secondary cases, this figure is a very accurate one.

Stocks[24] has used the proportion of secondary household to total cases of whooping cough as an "index of infectivity" for the

[24] Stocks, Percy: On the Epidemiology of Whooping Cough in London. *Journal of Hygiene*, 1932, xxxii, p. 581.

disease. He found that the proportion varied in one of the boroughs of London, England, from about 20 per cent to about 5 per cent, with an average value in the neighborhood of 10 or 12 per cent. If the same limitations are put upon the selection of secondary cases as those used by Stocks (a four-day interval between the primary and secondary cases and the discarding of secondary cases over 15 years of age), the average value of this index for the three years of the survey becomes 45 per cent instead of 51 per cent. The difference between the levels is probably in part related to the difference in average family size in Cattaraugus and in the London borough studied by Stocks and in part to a difference in the manner of collecting the data.

Stocks has pointed out that the actual value of this index varies somewhat with family size, and he therefore concentrates his attention less upon the average figure than upon the fluctuations shown during short intervals of time. These fluctuations he relates to fluctuations in the incidence of whooping cough in the borough, finding that the index falls during an outbreak from levels of 20 to approximately 5, and rises gradually thereafter. These changes, he feels, are probably due "to changes in the specific immunity, active and latent, of the population at risk."

In the present survey data, similar fluctuations in the value of the index are in evidence and they are similarly related to the incidence of whooping cough. However, there are also evident very definite changes in the size of attacked family, which also seem to be related to fluctuations in the index and in the incidence and which may at least in part explain the variations in index figures commented upon by Stocks. Apparently in Cattaraugus the larger families and those with the greater number of individuals with no prior history of whooping cough are more likely to be attacked in the early phases of an epidemic than in the later ones.

Recapitulating briefly the data on contacts up to this point, it

has been shown that 12.1 per cent of all the survey cases were primary cases in their respective neighborhoods and therefore infected by sources and in ways which can only be surmised. Another 13.6 per cent was attributed to casual neighborhood or vicinal contact. The somewhat larger proportion of 23.5 per cent was attributed to school attendance. The balance, or 50.7 per cent, were quite definitely secondary cases in their respective homes and have been attributed to familial contact.

The limitations of the indirect method of reaching these conclusions, particularly as regards the separation of vicinal from school contact, have been emphasized. It is evident that, even in this rural area with quite simple contact possibilities, the relationships among individuals are complex enough to warrant much more intensive studies than could be made by the method of the present survey. Such studies have in fact been made in and near the survey area, and one of them was described by Burroughs.[25] Three small outbreaks were observed and contact records carefully kept by visits made at very short intervals. A total of thirty-seven cases was recorded in these three small outbreaks, of which three, or 8.1 per cent, were infected outside the respective neighborhoods; four, or 10.8 per cent, by vicinal contact; eight, or 21.6 per cent, by school attendance; and twenty-two, or 59.4 per cent, by familial contact. The numbers are small and the regions kept under observation were purely rural areas outside the villages, but the proportions are rather surprisingly similar to those reported for the present survey.

4. *Contact and the Risk of Infection.* The mere enumeration of cases attributable to various forms of contact, while important from the point of view of determining modes of spread, is relatively valueless without some measure of the risk of infection associated with the types of contact under consideration. From

[25] Burroughs, Travis P., M.D.: An Epidemiological Study of a Rural Outbreak of Whooping Cough. The Milbank Memorial Fund *Quarterly Bulletin*, January, 1932, X, No. 1, pp. 41-52.

what has been said above about the complexity of relationships even in the farm sections, it will be evident that only tentative answers at best can be obtained to these questions from the survey data. However, the studies of Burroughs, previously mentioned, offer a very useful check on the accuracy of the conclusions at least as far as the purely farm contacts are concerned.

In one respect, and that is, perhaps, the most important, the survey data yield very valuable information, namely, in determining the secondary attack rate in attacked households. This is given in some detail in Table 12, both because these data are almost unique in their completeness and because frequent reference has been made to them above. The rapid fall in the secondary attack rates in Table 12 for all persons, with advancing age, is, of course, in part a result of the increasing number of immunes in the family in older age groups. The secondary attack rates among "susceptibles" are quite striking in their maintenance of fairly high levels until about the fifteenth year, however. Very little has appeared in the literature which is comparable with these data, and what there is deals primarily with urban centers. The published data do, however, suggest that in urban areas there is a much more rapid fall than is evident here among "susceptibles."[26]

The separate studies of Burroughs, noted above, check quite well the rates for all ages given in Table 12. Twenty-two cases occurred among fifty-three persons exposed familially, a rate of 41.5 per cent. Of these there were seventeen cases and twenty-four exposed

[26] Comparable data for the City of Cleveland are given for the year August, 1925, to July, 1926, by Howard Whipple Green in "Communicable Disease Analysis," Cleveland Health Council, 1929. The percentage of "susceptibles" contracting whooping cough in families as secondary cases falls from 70.7 per cent in the 0-4 age group to 12.3 per cent in the 10-14 age group, the total percentage at all ages being only 36.3. In his "Effect of a Whooping Cough Epidemic upon the Size of the Nonimmune Group in an Urban Community" (The Milbank Memorial Fund *Quarterly Bulletin*, October, 1932, x, No. 4, pp. 302-314), Sydenstricker gives "susceptible" attack rates at ages under 15 years in Hagerstown families. Attack rates are generally 5 to 10 per cent higher than secondary attack rates but show essentially the same trend. The attack rates in this case fell from about 90 per cent at the younger ages to 25 per cent at age 14.

persons without prior history of attack, giving a rate of 70.8 per cent for "susceptibles."

School attendance is another mode of spread upon which very reliable survey data are available. The problem of obtaining secondary attack rates for schools is somewhat less simple than that of obtaining them for households because a certain number of children who attended attacked schools and developed whooping cough were secondary cases not only in their schools but in their own homes. As the home exposure is undoubtedly the most intimate, these cases have been credited to the home rather than to

Table 12. Household secondary attack rates, Cattaraugus County, 1929-1932.

Age[1]	All Persons			"Susceptibles" Only		
	Per Cent Attacked	Secondary Cases	Exposed Population	Per Cent Attacked	Secondary Cases	Exposed Population
All Ages	29.8	142	476	80.1	133	166
0	82.4	14	17	82.4	14	17
1	100.0	10	10	100.0	10	10
2	81.8	9	11	81.8	9	11
3	100.0	12	12	100.0	12	12
4	90.5	19	21	100.0	19	19
0-4	90.1	64	71	92.8	64	69
5	92.3	12	13	92.3	12	13
6	44.4	4	9	80.0	4	5
7	77.8	7	9	100.0	7	7
8	61.1	11	18	90.9	10	11
9	47.0	8	17	75.0	6	8
5-9	63.6	42	66	88.6	39	44
10	66.7	4	6	100.0	4	4
11	28.6	4	14	80.0	4	5
12	40.0	2	5	100.0	2	2
13	33.3	3	9	75.0	3	4
14	—	1	8	—	1	1
10-14	33.3	14	42	87.5	14	16
15-19	16.3	7	43	53.8	7	13
20+	5.9	15	254	37.5	9	24

[1] Ages are computed, as of the last birthday, when whooping cough appeared in the household. For the general morbidity data in previous sections ages were computed as of each survey year.

Age	All Pupils			"Susceptible" Pupils Only		
	Per Cent Attacked	Secondary Cases[1]	Exposed Population[2]	Per Cent Attacked	Secondary Cases[1]	Exposed Population[2]
Under 10 years	22.0	49	223	41.2	47	114
10 years and over	4.5	17	376	14.7	14	95
ALL PUPILS	11.0	66	599	29.2	61	209

[1] Includes only school secondary cases which were primary household cases.

[2] Includes all pupils attending at the time these schools were attacked with the exception of the first cases in the respective schools and with the exception also of any household cases secondary to the primary cases who were at the time attending the same school.

Table 13. Secondary attack rates in attacked schools, including farm grade schools and village grade and high schools, Cattaraugus County, 1929-1932.

the school, but, except for the household secondaries of the primary case in the school, they have been counted in the exposed population of the school.

Table 13 shows the age specific rates for all pupils and for "susceptibles." To one familiar with the large number of pupils attacked by whooping cough in farm grade schools these rates seem quite low. One reason is, of course, that many of the children who were attacked were exposed at home as well as in school, and another is that the larger village schools, included in Table 13, have a somewhat lower attack rate, particularly at the older ages. These differences may be seen in Table 14. Correction for age differences in the farm and in the village schools makes but slight changes in the rates for all ages.

The studies of Burroughs rather closely corroborate the rates in the farm grade schools. Out of fifty-two children known to have been exposed through school attendance, eight were considered to have acquired their infection in this manner, a rate of 15.4 per cent. For "susceptibles" his rate was somewhat but not significantly higher, there having been seventeen exposures and seven cases, the proportion infected being 41.2 per cent.

Because of the lack of contact data, it is impossible to make a similar analysis of the risk of infection for vicinal contact. From

the more detailed data of Burroughs it was found that only 4 cases were attributable to vicinal contact out of 127 known to have been exposed in this way, the incidence being only 3.1 per cent for all persons. Of the 127 only 42 were found to have a negative history of attack, so that the "susceptible" rate was 9.5 per cent. Burroughs' data apply, however, primarily to the farm sections. Possibly the village rates would be somewhat higher. It is also true that if it were possible to exclude from Burroughs' data the persons above the age of 20 who, though giving no history of whooping cough, are relatively immune, the rates would be higher. It does not, however, seem probable that this form of contact can rank even in villages as a serious risk with the two types previously described: household contact and school attendance.

The discussion has thus far centered upon the risks of infection within the neighborhoods in which outbreaks were observed. No data are obtainable either from the survey or from the more intensive studies of Burroughs which will throw light upon the risks of infection to a person of a neighborhood from outside sources. It would appear, however, that relatively few cases are acquired in this way, although the consequences of the importation of whooping cough may be very unfortunate.

Table 14. Secondary attack rates shown separately for attacked farm grade schools and village grade and high schools, Cattaraugus County, 1929-1932.

Age	All Pupils			"Susceptible" Pupils Only		
	Per Cent Attacked	Secondary Cases	Exposed Population	Per Cent Attacked	Secondary Cases	Exposed Population
	FARM GRADE SCHOOLS					
Under 10 years	19.8	17	86	42.5	17	40
10 years and over	12.7	9	71	21.9	7	32
ALL PUPILS	16.6	26	157	33.3	24	72
	VILLAGE GRADE AND HIGH SCHOOLS					
Under 10 years	23.4	32	137	40.5	30	74
10 years and over	2.6	8	305	11.1	7	63
ALL PUPILS	9.0	40	442	27.0	37	137

V. POSSIBLE PREVENTIVE MEASURES

From the above summary of the number of cases attributable to various forms of contact and of the associated risks, it is evident that household contact is the most important factor in the dissemination of the disease. The involved relationships implied in school attendance are next in importance, although, as has been suggested, actual school contact may play a relatively minor part. Finally, vicinal and extravicinal exposures have a small but definite rôle to play, the latter being of importance chiefly because of the effects of the importation of whooping cough into a community.

The bare analysis of cases and risk with respect to contact may, however, be misleading. If the word "spread" be defined as distribution among the households of a community instead of distribution among individuals, there is no doubt about the fact that school attendance is responsible for more cases than any other in the farm sections and possibly also in the villages. If any lesson can be drawn from the observations thus far made upon contacts, it is that whooping cough does not become widely distributed in rural Cattaraugus unless it can do so through school attendance. It should therefore be possible in that area and very probably in many similar rural areas, to apply restrictive measures at the school in order to reduce incidence not only in attacked schools but throughout the neighborhoods in which they are located.

As a first step in controlling whooping cough and perhaps other infectious diseases in rural areas at the school, the communicable disease history of each pupil should be recorded on entering and brought up to date at the beginning of each school year. Such data, if obtained from the parents, are reasonably accurate and in the case of whooping cough a sufficient guarantee against subsequent attack, so that restrictive measures may be somewhat directed thereby. Three possible experimental procedures suggest themselves readily in the particular instance of whooping cough in addition to those already in force in schools. The first is the im-

mediate dismissal for a few days of any "susceptible" child showing a cough of the dry, consecutive variety.

It is recognized that this is somewhat drastic, particularly when, as sometimes occurs, such coughs are shown by a large proportion of the pupils and do not end in whooping cough. However, it seems probable that the time lost, in the long run, would be less than when whooping cough does occur. This measure would be especially useful in the farm grade schools where the contacts outside of school are known to be limited.

Another measure, which could be tried experimentally either as an alternative to dismissal or as a separate project, is that of enforcing the use of gauze masks by all pupils known not to have had whooping cough when they show suspicious symptoms. Such a procedure could be made routine in the small country grade schools and possibly would assist in reducing the incidence of other acute upper respiratory infections as well.

Inoculation against whooping cough is a procedure of doubtful value at present, although recent claims suggest a relatively long-lived immunity. It should be possible under farm school conditions, where the secondary attack rate is known to be fairly high, to set up a controlled experiment which would assist in demonstrating the effectiveness or ineffectiveness of this procedure.

These are three possible approaches to the problem of reducing the community incidence of whooping cough through restrictive measures applied in farm grade schools. Their value may be determined with relatively little expense, but any such experiment would have to be applied on a fairly large scale and over a long period of time, for, as has been shown, a large proportion of the farm grade schools remained unattacked during the three-year period of the Cattaraugus survey. The effectiveness of similar measures could also be tried in village schools, but the less intimate relationships existing there and the possibly greater frequency of infective extra-curricular contact would make them less useful.

Age	Percentage Distribution		Cases	
	Primary	Secondary	Primary	Secondary
ALL AGES	100.0	100.0	81[1]	142
0-4	14.8	45.1	12	64
5-19	82.7	44.3	67	63
20+	2.5	10.6	2	15

[1] Excludes 57 primary cases in families without secondary cases, distributed as follows: 24 cases in the youngest, 30 in the middle, and 3 in the oldest age groups. The ages here are computed as noted under Table 12.

Table 15. Percentage distribution of primary and secondary household cases of whooping cough by age, Cattaraugus County, 1929-1932.

The value of postponing an almost inevitable attack of whooping cough in children of school age might be questioned. It should be remembered, however, that it is not entirely a question of postponing the attack in the pupils themselves. In this area, whooping cough appears to be carried home to younger children by their older brothers and sisters, as the percentage distributions in Table 15 show.

As a further argument for postponing the age of attack even in children of school age, the rapid decline in incidence among older children without history of recognized attack might be cited, although it must be confessed that a certain proportion of these may be attacked in later life if sufficiently exposed.

It cannot be claimed that repressive measures instituted in schools will entirely eliminate whooping cough in rural areas. If, after due experimentation, some effective preventive action were found, it could at best reduce the incidence by about one-half. Had a perfect system of prophylaxis been applied in the schools of Cattaraugus at the time of the survey, it would have eliminated the 66 cases which were secondary to primary cases in the various attacked schools and 75 cases secondary to these in the households where the former lived, in all, 133, or about half of the 280 recorded cases. No readily applicable preventive measure suggests itself as a protection against the chance exposures outside the

neighborhood or within the neighborhood outside the school. The school would appear to offer the best point upon which to focus preventive efforts, if not in the villages at least in the farm sections of rural Cattaraugus.

ANNOTATIONS

HEALTH AND HUMAN PROGRESS[1]

WITHIN the 250 pages of this book the author has attempted to assemble the facts which portray the evolution of human progress insofar as health is an accompaniment of it. René Sand is at once philosopher, scientist, and internationally-known public health and social worker. His connections with the University of Brussels, with various health committees of the League of Nations, and his experience as organizer of international conferences of public health and of social work have served well to prepare the author for this undertaking. His activities in these fields have put him in touch with historical source material, with current reports, surveys, and scientific studies, and with the wide variety of administrative arrangements for carrying on public health activities in the countries of Europe and America. He has also had unusual opportunity to know personally those who, in recent years, have made the greatest contributions to both the science and the art of public health throughout the world.

The theme of his undertaking is well characterized by his quotation from the philosopher, Bergson, which he places conspicuously as a frontispiece to his book: "Man hardly realizes that he can shape his own destiny." M. Edouard Herriot, in a preface, interprets Dr. Sand's efforts as attempting "to make progress serve us instead of enslave us."

The first two chapters are devoted to an historical and philosophical statement of the evolution of socialized medicine. He points out that medicine, nourished as it was by physics and chemistry, and subsequently by physiology, bacteriology, and parasitology, "did not approach the social domain spontaneously, but was dragged into it by the development of hygiene, of public assistance, of social insurance, of labor

[1] Sand, René: HEALTH AND HUMAN PROGRESS. New York, The Macmillan Company, 1936. 250 pages.

legislation." The contributions of psychology and sociology added to the more rigid, scientific contributions of other sciences which earlier dominated medical advance tended to make medicine more social, more humane, more disposed "to recognize the whole nature of man, as shaped by his home, his surroundings, his work, his recreation, his struggles and aspirations." "We observe," says the author, "that nothing remains individual. Everyone borrows from the community. Production and sale, education and assistance, become collective functions calling for a rational organization. Henceforth can medicine be anything but a social service?"

Within the compass of a few pages the author traces the historical evolution of the concept of social medicine and illustrates the gradual working out of this concept in actual activities in the centuries preceding our own. He also refers to the evolution of science from "the abstract idea of the typical man," to the observation of actual differences in the same individual. This tended to break down rigid partitions, and to demonstrate increasingly the complexities and, at the same time, the complete interdependence of scientific factors in every personality, and that this interdependence extends to all the factors of the life of all. Our modern life is built on interdependence of individuals and of nations. To affect most helpfully the individual or the group then, "the priest, the physician, the teacher, the judge, the business man, the nurse, and the social worker cannot act in compartments, but must combine their efforts." In this part of his discussion, Dr. Sand gives us a helpful interpretation of the difference of national emphasis which has occurred in the evolution of sociological medicine in the leading countries of the world where medicine and public health have made most significant advances.

To help the reader appreciate the influence of various existing classifications of society upon public health and progress, he reviews the effects of the distribution of population between town and country, of the density of population, of the grouping of society into active and productive workers as distinguished from non-active, of the division of population on an economic basis as measured by amount of income, of occupational groupings, as well as other significant divisions of society into so-called classes.

This prepares the way for the discussion of one of the best chapters of the book, entitled "Balance Sheet of Sickness and Death." In broad

strokes in this chapter he compares the mortality and morbidity of the important countries of the world. He shows how these have changed in historical times. He reviews the facts with regard to duration of life comparatively by countries at the present time, and the differences in rates of change in longevity in these countries for such periods as there are reliable data. He brings together comparative facts with regard to the mortality at different ages in different countries. He analyzes deaths by their leading causes, and shows present facts with regard to these as well as the changes which have taken place in these factors. He assembles available statistics of morbidity, and reviews the relation of the rates of morbidity to the rates of mortality in different groups of diseases. He points out that physical and mental vigor, or general *fitness,* is much less general than commonly believed. He asserts that "the rapidity with which human material is wasted" is striking, and cites as illustrating this a study of 436,000 infants born in France in 1894. Only one-half of these reached the age of twenty in good health. "In 40 years, at the actual rate of mortality and morbidity in France, of 100 infants conceived within the year, 40 would be dead, 30 would be more or less unfit, and 30 only would enjoy good health." Progress is more than saving life, he says. It is related even more to the preservation and development of health and vitality with reference to productiveness and happiness. In the discussion of this balance sheet he brings together facts that tend to show that health efforts pay, and therefore should be supported on economic as well as other grounds. He also raises and discusses the objection frequently made that hygiene and social action tend to paralyze natural selection as a factor in progress, and after assembling facts relating to this concludes with the statement, "Selection by negligence and ignorance is not natural selection."

In another interesting discussion, Dr. Sand presents and criticizes data which tend to show physical and mental inequality among individuals of different social classes and groups. He presents evidence that tends to show that in size and weight there are little differences between economic and social classes at the very beginning of life, but that important physical changes are observable soon after. The evidence of these differences, both physical and mental, is brought together from a wide variety of sources and discussed critically and interestingly. He summarizes this with the statement that "For physical vigor as for intelligence, as well as for disease and death, inequality is patent between

the social classes. Except in extreme destitution this inequality does not exist at birth; it appears during the first weeks of life, becomes accentuated during childhood, diminishes later, but never disappears. These differences are reduced by the progress of hygiene and welfare."

An important part of the volume is occupied with a review of the more significant factors affecting health and human progress—heredity and environment, occupational factors, domestic factors, economic factors, sanitary factors, and educational factors.

In the concluding chapter, entitled "Human Economics," Dr. Sand points out that "Each country, within certain limits, decides its own mortality." He points out that mortality in the first two-thirds of the Nineteenth Century exceeded 30 in all countries, whereas at the present time it is 8 in New Zealand, 8.6 in Australia, 9 in Holland, 9.9 in Canada and South Africa, 10.8 in Germany, 10.9 in the United States, 12 in England and Wales, and in other countries varies all the way from the low of 8 in New Zealand to the high of 28.8 in Egypt. He cites the fact that the average duration of life, which in ancient times appears to have been about 25 years, although not exceeding this greatly today in India, China, and Egypt, has risen to more than 60 in the United States, Australia, Denmark, Sweden, Holland, and New Zealand. Two centuries ago, he reminds us, one infant out of three died before it was a year old. In China and equatorial Africa this record is still not much better; but in twenty-six countries out of fifty-five possessing vital statistics only one infant in ten or even lower now dies in the first year, and in New Zealand, only one in thirty-one. The history of civilization has been a correlated improvement of both health and economic status of individuals and families. Poverty is less as health increases, and lack of health and poverty have historically been united in a vicious circle. Sociological medicine, closely allied to hygiene and social policy, aims at the full protection and development of human personality, including its physical, economic, and spiritual values.

Such are some of the facts and conclusions presented in Dr. Sand's interesting volume. It is interesting and readable in spite of the fact that it assembles so many summaries of facts that it also makes a handy reference volume. Although published in America, its facts and conclusions are drawn from such wide international sources that it should appeal to readers of many countries, particularly those most concerned with developing still further through public hygiene and social action

the health, vigor, economic productivity, and happiness of their fellow citizens. It is more than a treatise on public health. It is a discussion of the history and possibility of social well being with special reference to health.

BAILEY B. BURRITT

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SURGEON GENERAL'S REPORT ON HEALTH AND DEPRESSION STUDY

IN the Annual Report of the Surgeon General of the United States Public Health Service to Congress, for the fiscal year 1935, an account is given of various studies conducted by the Office of Statistical Investigations on health and the depression. Most of these studies were conducted in collaboration with the technical staff of the Milbank Memorial Fund and the results of these particular studies have already appeared in the *Quarterly*. That section of the Surgeon General's Report which deals with this subject was prepared by Senior Statistician Selwyn D. Collins and gives a succinct summary of the results of the various inquiries. It may be interesting to readers of the *Quarterly* to quote from the official report as follows:

> Studies of various phases of the relation of sickness to the depression have been continued throughout the year. Three papers in a series which is to constitute a final report on the subject were sub-

Incidence of disabling illness in the early spring of 1933 in 11,511 canvassed white wage-earning families classified according to employment status of the wage-earners during 1932, in ten localities.

Employment Status of the Family's Wage Earners	Illnesses per 1,000 Persons for Three-Month Period (Adjusted for Age)			Number of Persons Observed
	Total	Onset Within Survey Period	Onset Prior to But Sick During Survey Period	
Full-time workers (with or without part-time workers)	123	91	32	21,022
Part-time workers (1 or more; no full-time)	160	112	48	21,224
No employed workers	182	121	61	4,935

mitted for publication in the *Public Health Reports,* and the first one appeared in the issue of May 3, 1935. The accompanying table gives the sickness rates obtained in this study for families classified according to employment in 1932, the year immediately preceding the survey.

Considering all illnesses, the rate for persons in families with no employed workers (182 per 1,000) was 48 per cent above that in families with a full-time worker (123 per 1,000).

Persons of low income, and particularly those whose economic status changed from reasonable comfort to very poor during the depression, had high sickness rates. However, the greatest difference in sickness rates appears between persons on relief and those not on relief. The accompanying table gives the rates.

Considering all illnesses, the rate for persons in families which fell from relative comfort in 1929 to poor in 1932 (145 per 1,000) is 21 per cent above that for families who remained in the comfortable class; those who fell from relative comfort in 1929 to relief in 1932 had a still higher sickness rate, 208 per 1,000 persons, or 73 per cent above the rate in those families which remained comfortable throughout the period (120 per 1,000). (The word "comfortable" is here used in a relative sense only; the incomes of all of the surveyed families were very low.)

Since sickness of some member of the family, particularly of the

Incidence of disabling illness in the early spring of 1933 in canvassed white wage-earning families classified according to change in family income between 1929 and 1932 and relief status in 1932, in eight large cities.

Economic and Relief Status[1]	Illnesses per 1,000 Persons for Three-Month Period (Adjusted for Age)			Number of Persons Observed
	Total	Onset Within Survey Period	Onset Prior to But Sick During Survey Period	
Comfortable throughout the period 1929-1932	120	90	30	4,117
Comfortable in 1929 but poor in 1932	145	103	42	1,479
Comfortable in 1929 but on relief in 1932	208	142	66	1,328

[1] In all cities except New York "poor" means an income of less than $150 per capita, and "comfortable" an income of $425 or more per capita. In New York (including Brooklyn), the corresponding figures are under $250 and $500 and over.

chief wage earner, is frequently the reason for the family being on relief, the high rate in the relief group suggests that selection is an important factor; that is, the relief population contains a disproportionately large number of persons who have chronic diseases or physical defects or who are susceptible to frequent attacks of acute illness.

As a further study of the health of the population on relief, an analysis of data on physical impairments and chronic diseases among the relief and the nonrelief population of a large city was undertaken in cooperation with the Federal Emergency Relief Administration, under whose auspices the information was collected. These data indicated that (a) a much higher proportion of persons on relief had serious physical defects or chronic diseases than those of the same occupational class who were not on relief; (b) in both the relief and nonrelief populations the proportion with impairments and diseases increases regularly from the lowest rate in professional, proprietary, and clerical classes to the highest among unskilled laborers; (c) that among the "white-collar" occupations illness and physical impairments are relatively a more frequent reason for getting on relief than among laborers, and particularly among colored laborers. Among unskilled laborers, where income is always low and adaptability to new conditions and suitability for new or changed employment is limited, reasons of a purely economic nature often put the family on relief, but among the more adaptable "white-collar" classes the family can more frequently meet new economic conditions unless handicapped by impairment or illness.

This Office also cooperated with the Federal Emergency Relief Administration in the analysis of data on physical defects and chronic diseases among relief families in a large group of cities; the data were collected as a part of an occupational census of the relief population of cities scattered throughout the country. A bulletin issued by the Federal Emergency Relief Administration gives the results (Federal Emergency Relief Administration Research Bulletin, Series I, No. 6).

The report also refers to a study undertaken in collaboration with the California State Health Department and the California Emergency Relief Administration to determine whether mortality in the families of the unemployed and others severely affected by the depression, increased, remained stationary, or decreased during the period 1929-1934. This study consisted of a house-to-house canvass of some 30,000 families, and will materially increase the total amount of data relating to mor-

tality in the same group of unemployed families before and during the depression. The first series of health and depression studies in ten cities showed a much higher mortality during the period 1929-1932 in the unemployed families than in the employed families but the number of deaths in the 12,000 families surveyed were not sufficient to permit of detailed statistical analysis. The California study is now in the process of tabulation.

EDGAR SYDENSTRICKER

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THE SPREAD OF TUBERCULOSIS IN FAMILIES

FROM the Henry Phipps Institute in Philadelphia during the past ten years have come studies of the spread of tuberculosis in families which have made important contributions to knowledge of the epidemiology of the disease. In a recent issue of the *American Journal of Hygiene* a summation of certain phases of these studies has appeared in a series of three articles.[1]

In the first article dealing with the organization of an out-patient tuberculosis clinic for epidemiological investigation, the authors conclude that "an out-patient clinic or dispensary that limits its service to a district in which it maintains visiting nurses may be effectively organized for investigation of the character and mode of spread of tuberculosis, provided that observations be continued over a period of years corresponding in duration with the chronic course of the disease." They point out also that investigation of the epidemiology of tuberculosis must include infection demonstrable by the tuberculin test and X-ray examination as well as clinically manifest disease and must determine the relation of one to the other.

In the second study dealing with the spread of tuberculosis in families, it was concluded that the spread of tuberculosis occurs in large part by long drawn out family or household epidemics in which the disease is slowly transmitted from one generation to the next. The study showed

[1] Opie, Eugene L. and McPhedran, F. Maurice: The Organization of an Out-Patient Tuberculosis Clinic for Epidemiological Investigation.
McPhedran, F. Maurice and Opie, Eugene L.: The Spread of Tuberculosis in Families.
Opie, Eugene L., McPhedran, F. Maurice, and Putnam, Persis: The Fate of Persons in Contact with Tuberculosis: The Exogenous Infection of Children and Adults.
The American Journal of Hygiene, November, 1935, xxii, No. 3.

very clearly that the family contacts in greatest danger of contracting tuberculosis were those in families where there was a case with discoverable tubercle bacilli in the sputum. Not only was the infection rate as revealed by the tuberculin test higher at an earlier age among contacts of positive sputum cases but also a much higher proportion was found to have lesions (both primary infection and reinfection type) demonstrable by X-ray than was observed among contacts in tuberculous families where there was no known dissemination of tubercle bacilli.

Approximately one-third of the children exposed to open tuberculosis acquired calcified nodules of lungs or lymph nodes. Infiltrating lesions of first infection were found to be numerous in children from birth up to 5 years of age; after 15 years of age infiltrating lesions of first infection were noted to be "strand-like" and evidently healed or in the process of healing. Lesions of adult or reinfection type first appeared in the age period 10-14.

The third article is a study of the fate of persons in contact with tuberculosis and the exogenous infection of children and adults. The data of the study consist of records for 1,000 families under observation in the Out-Patient Clinic of the Henry Phipps Institute. Most of the persons included belonged to families of which some member had tuberculosis.

From the analysis of the data it was found that among white persons first exposed between birth and 9 years of age to tuberculosis with known positive sputum, 9.92 per cent of those living from 12 to 14 years after the beginning of exposure had acquired manifest tuberculosis. Among those exposed to tuberculosis with no tubercle bacilli found in the sputum, after a comparable period of time, only 1.97 per cent had acquired tuberculosis. Among persons first exposed between 10 to 14 years of age to tuberculosis with tubercle bacilli in the sputum, 20 per cent of those living 10 to 14 years after the beginning of exposure were found to have tuberculosis.

Among persons first exposed to familial tuberculosis with positive sputum after 15 years of age, 9.68 per cent of those living from 10 to 14 years after exposure had tuberculosis. Persons in the same age group living from 10 to 14 years after exposure to familial tuberculosis with no tubercle bacilli in the sputum had a tuberculosis rate of 6.86 per cent.

It seems appropriate to comment on these results. The difference in

the rate of tuberculosis among persons first exposed at ages 0-9 to tuberculosis with positive sputum in the family contrasted with the rate among those in tuberculous families where no tubercle bacilli were found in the sputum certainly may be considered significant. Apparently, for persons in this age group a decisive factor in the production of tuberculosis among those surviving 12 to 14 years after exposure was living in a family where there was dissemination of tubercle bacilli.

On the other hand, for persons first exposed to tuberculosis in the family after 15 years of age the difference in the rates was not striking for those in the two family groups living 10 to 14 years after exposure (1) with tubercle bacilli in the sputum and (2) those with no demonstrated bacilli in the sputum), even when proper consideration is given to the average death rate from tuberculosis within the 14 years for each of the two groups. This fact suggests that for persons exposed to familial tuberculosis for the first time after 15 years of age has been reached, some factor or factors other than exposure to known tubercle bacilli in the family must also be operating to produce morbidity from the disease.

Within the first two years after exposure to familial tuberculosis the prevalence of latent lesions was found to be very much greater among persons first exposed after 15 years of age or in adult life than for those first exposed at the earlier ages. This might be interpreted as an indication that a considerable proportion of the individuals in this age group had acquired some tuberculous disease demonstrable by X-ray before a primary case of manifest tuberculosis occurred in the family. To the public health worker it would be of interest to know to what extent the possession of tuberculous infection demonstrable by X-ray in this age group modifies the results of exposure to manifest tuberculosis in the family.

JEAN DOWNES